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Sentinel Surveys 1995-2005: Catch per Unit Effort in NAFO divisions 2J3KL

Relevés sentinelles 1995-2005 – Prises par unité d'effort dans les divisions 2J3KL de l'OPANO

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Abstract

Data from the Sentinel program in NAFO divisions 2J3KL are summarized and updated for 2005. They are presented as weekly average catch rates and annual relative length frequencies; number of fish at length divided by amount of gear for each set, averaged by year and gear type, and grouped by NAFO division. Catch rates in gillnet and on linetrawl improved in most areas, and in Division 2J were the highest in the time series.

Résumé

Les données recueillies dans le cadre du programme de relevés par pêche sentinelle dans les divisions 2J3KL de l'OPANO sont résumées et mises à jour pour 2005. Elles sont ventilées en fonction du taux de capture hebdomadaire moyen et des fréquences annuelles de longueurs relativisées; du nombre de poissons selon la longueur divisé par le nombre d'engins pour chaque mouillage, avec moyenne par année et par type d'engin, et groupées par division de l'OPANO. Les taux de capture au filet maillant et à la palangre étaient meilleurs dans la plupart des zones et, dans la division 2J, étaient les plus élevées de la série chronologique.

INTRODUCTION

Sentinel survey projects were formally announced by the Minister of Fisheries and Oceans in October 1994. The surveys in the DFO Newfoundland and Labrador Region are an extension of the index fishermen's project from the Northern Cod Science Project Program with modifications to allow for science activities achievable only under a fishing moratorium. Sentinel data collection continued during the commercial/index fisheries that occurred from 1998 to 2002.

The sentinel survey has the following objectives:

1. To develop a catch rate series for use in resource assessments.

2. To incorporate the knowledge of inshore fishers in the resource assessment process.

3. To describe the temporal-spatial distribution of cod in the inshore area over a number of years through, for example, the use of catch rate information, tagging studies, by-catch information and fishers' observations.

4. To gather length frequencies, sex and maturity data and sample ages for use in resource assessment.

5. To establish a long-term physical oceanographic and environmental monitoring program of the inshore areas.

6. To provide a source of biological material for other researchers. For example, tissue for genetic, physiological and toxicological analyses, cod stomachs for food and feeding studies and by-catch information.

Participants

The primary collectors of data in the sentinel survey are inshore fishers. Through consultation with inshore fishers and fisheries organizations, traditional inshore fishing grounds have been identified and mapped.

Fishers from communities within the boundaries of the identified coastal areas and who met eligibility criteria were invited to apply to participate in the survey. Where more than one application was received from an area, the project partner conducted a draw or lottery to select the participant. While there was considerable interest in the project in most areas, there were many sites from which only one application was received and others where additional canvassing was required to enlist participants. Selected participants were required to complete a six-week course designed by the Marine Institute of Memorial University in consultation with DFO. Topics covered included scientific sampling methods and equipment, computer use, resource assessment basics and presentation skills.

In order to minimize inter annual enterprise effects on data collection, participants are expected to remain with the survey over a number of years. It is also expected that most of the sampling activities will continue once commercial fishing operations resume and the sentinel participants will form a core of index fishers.

Sites

In 2005, forty-four enterprises participated in sentinel activities in NAFO Divisions 2J3KL (down from 57 or 58 prior to 2004). The specific location of each site was chosen after consultation between DFO scientists, fishermen, the Fish, Food and Allied Workers Union (FFAW) and the Fogo Island and Petty Harbour Cooperatives (for Fogo Island and Petty Harbour). Site selection was based on the need to survey throughout inshore areas and targeted historical fishing areas and historical gear use patterns.

Sampling Strategy

Table 1 gives the homeport of the participants in the sentinel surveys; showing the number of sets completed in each year, the number of weeks allocated for sentinel activity, and the number of enterprises participating in the survey. The timing of sampling was determined after discussions with fishers but was targeted for seasonally appropriate times based on historical fishing patterns.

The number of trap sites in 2J3KL had been reduced from 35 in 1998 to 12 in 1999, and in 2000, 14 traps were fished. In 2001 and 2002, only a few traps were used, primarily to collect biological data and trap fish to tag. Traps have not been used since then. Participants used either baited trawl lines or gillnets for the remaining weeks of the survey. Non-trap sites fished either baited trawls or gillnets for the full survey. While traps are in the water continuously, they were hauled three days per week. Two sites at Petty Harbour fished baited hand lines exclusively. Hook and line, hand line and gillnet crews fished up to three days per week. Fishing days in the week were selected at the discretion of the crew and depend primarily on weather conditions.

When a cod trap was hauled prior to 2000, the crew estimated how much fish by weight had been caught, removed a random sample for biological sampling and released the remaining catch. Meshed and/or dead, floating fish were retained and brought ashore. Fishers were instructed to release as much live fish as possible. For 2000-2002, traps were used primarily as a source of biological data (length frequencies, otolith samples and frozen samples) and as a means to tag fish.

Hook and line crews fished two tubs of baited linetrawl. Each tub consisted of approximately 500 hooks for a total of 1000 hooks per fishing day. Gillnet crews fished a maximum of six fifty fathom 5 ½ inch monofilament gillnets. Nets were rigged 2-3 to a fleet and up to three fleets were fished per fishing day. In addition, selected sites fished one 3-¼ inch monofilament gillnet at least one day per week. All fish caught in gillnets and on hooks were landed and measured. If catches exceeded 500 kg per week, the numbers of nets in a fleet were cut back. However, some consideration was given to bottom topography and net performance when reducing the number of nets in a fleet. Similarly, the number of hooks per tub was reduced if landings exceeded 500 kg per week. Other measures were considered if fish are particularly abundant in an area and catches appear to be excessive even with the minimal amounts of gear possible.

Hand lines were used mostly in conjunction with nets or trawls as a means of determining presence of cod for tagging purposes or when nets were not catching fish. The exception to this was the Petty Harbour area where only hand lines and traps are permitted. In that area, participants used hand lines for the entire survey period. Sites were fished with hand line similar to other gear types,

with a control location and experimental locations. The time fished on each ground was recorded, as was number of hooks on each line and number of lines fished. Problems with using these data to calculate a catch rate include drifting off the grounds (which depends on tide conditions, weather conditions and size of the ground), time required to get back on the ground is not accounted for in the time fished, and the effect of fishing more hooks per line is not likely multiplicative to the catch rate. For example, fishing 4 hooks per line does not necessarily mean the catch rate would be 4 times greater than fishing one hook per line if the density of fish on the grounds was equal. Once a fish was hooked, a line is generally pulled up before more than one fish could be caught.

Prior to the start of sampling in 1995, a fixed (control) location on the fishing grounds was established for each site and will remain fixed for the duration of the project. Each fishing day, up to half of the gear was set at the control site. The remainder of the gear (experimental) was set at one or two other locations on the fishing grounds at the discretion of the crew. The location of each fishing set was plotted on a nautical chart. The time of the set and the soak time for the gear were recorded. Other environmental observations were recorded, including wind direction and speed, percent cloud cover, tide conditions, presence of invertebrates (bait) and other fish species in the area, marine mammals, sea birds and any other variables which might have influenced fishing behavior. Selected sites were equipped with a CTD (measuring temperature and salinity at depth). At these locations, casts were conducted in the vicinity of fishing sets each fishing day. CTD locations were fished for subsequent years if possible.

When the gear was retrieved, catches from the control and experimental gear were kept separate and sampled on shore. All fish from gillnet, hand line and linetrawl, and a sample of the catch from traps, were measured for length and sex. Otoliths were sampled on a length-stratified basis and stored in manila envelopes with relevant information recorded on the outside. Every other week, selected sites collected a sample of up to 100 frozen fish. These were transported to St. John's for detailed biological sampling. All information was recorded on forms similar to those used by the Port Sampling Section and on DFO Research Vessels

Other biological samples were collected as needed.

Data Presentation

The data were summarized for each NAFO division and are here presented by gear type. The relative length frequency plot depicts the number of fish at length scaled by total amount of gear fished so that changes in length frequency distribution may be compared across years. Lengths, in 1cm intervals, are from both control and experimental gear, and for gillnet and linetrawl represent every fish measured, as the total catch is measured. Data are shown as an average of the relative length frequencies for each fisher in the division. The second figure on each summary page gives catch details broken down by year, including number of fish measured (Nmeas), total number of sets (Nhauls) and number of sets in which no fish were caught (Nzero). The CPUE figures (bottom figure on each summary page) give average weekly catch rates, in number of fish per net or 1000 hooks, and are constructed by calculating a daily catch rate for each set and averaging all the CPUEs for all sets (control and experimental) in a given week.

RESULTS

Fourty-four inshore fishing enterprises representing communities from Black Tickle to St. Mary's Bay participated in the 2J3KL Sentinel Survey for 2005 (45 in 2004). Survey activity covered mostly summer and fall periods in all years, traditional fishing times for the areas involved.

Figures 1 to 3 shows the catches (in scaled symbols) from every set in 2005 of 5 ½" gillnet and linetrawl. Control sites were generally consistent from year to year but shifts in location may have resulted due to weather or tide conditions or competition for sites by commercial activity.

Figure 4 shows overall average CPUE by division from 1995-2005 for the three main gear types used in sentinel activity. 3L had the highest catch rates in gillnet over the time series. Gillnet (5 ½") catch rates in all divisions declined from 1998 to 2002 and then increased from 2002 to 2005. When compared to division 3L, linetrawl catches were generally higher in 3K until 1998, and once again from 2003-2005. The 2005 value was the second highest observed. Catch rates in 2J were very low compared to 3K and 3L in all gears in all years. In 2005, however, catch rates in 5 ½" gillnets increased substantially in 2J and were triple those seen in other years.

Figures 5-7 give mean CPUE by community for gillnet and linetrawl organized from north to south. Catch rates in 5 ½" gillnet were very low in northern areas and were highest around the Bonavista area in most years (figure 5). In 2005, many communities had substantially higher mean catch rates than previous years. Small mesh gillnet (figure 6) showed more variability in CPUE from year to year and between locations, with high catch rates in 2J and 3K in some years. Catch rates were most consistent from Wesleyville to Petley. Linetrawl was not as widely used in 2J3KL and catch rates were variable (figure 7). There was less change in CPUE in the area around Aspen Cove, Lumsden and Wesleyville then the decline seen in La Scie, Shoe Cove and Durrell.

Tables 2-6 show the change in mean catch rate for each location between subsequent years. Changes greater than 10% are highlighted.

Length frequencies, scaled by amount of gear used, are summarized in figure 8. The same data are given in the length frequency plots on the summary sheets that follow (figures 9-65). The 5 ½" gillnet frequencies (Fig. 8, top plot) show the narrowest range of selectivity (50-80cm). Catch rates in this gear declined from 1998-2002 and then increased from 2003 to 2005. 3L has higher catches than the other divisions.

The small mesh gillnet frequency has two modes (Fig. 8, middle plot), reflecting two size ranges of fish caught in the gear. Catches of smaller fish, caught by meshing in the net, declined in 3K from 1996-1999 and have remained at this level since then with the exception of 2003 and 2005 which showed higher catches of small fish. In 3L, catches of these smaller fish have remained relatively constant over the series with the exceptions of 1999, which had lower catches, and higher catches were observed in 2003 and 2005. In 2J, this smaller mode decreased from 1997-1999, and has been variable since then. The larger modes in the small mesh frequencies are due to larger fish that entangle in the net. The catches of these larger fish in 3 1/4" gear have declined noticeably from 1998 to 2001 in all divisions, but increased in 2003 and 2004, similar to the pattern seen in the 5 ½" gear.

Linetrawl frequencies (Fig. 8, bottom plot) show a wider distribution of fish sizes. In 3K, linetrawl catch rates declined from 1997 through 2000 and then increased in 2003 and have remained high since then. Linetrawl catches in 2J were low in all years and no sampling was done with this gear since 2001.

Figures summarizing the data by gear for the entire stock area and also broken out by division follow on pages 20-38. The bottom figure on each page shows the weekly average catch rate. The decline in catch rate from 1998-2002 is most evident in 5 ½" gillnet plot (figures 9-11). Catch rates in small mesh gillnet (figures 21-23) were lower in the first part of the year from 2001 to 2005, and good catch rates in the latter part of the year (sites surveyed in the fourth quarter in 3K and 3L) bring the average up. Linetrawl catch rates in 3K (figures 39-41) have increased from 2000-2001 to 2005, and in 3L have been variable, but increasing from 2003 (figures 42-44).

Figures 45-62 show the data grouped for comparison to model formulations presented for this assessment. Information for the central inshore area (3Khi+3Lab) is grouped together for each gear type, and data from enterprises in the southern inshore area (3Lf, 3Lj and 3Lq) are grouped together in these summary plots.

Table 1. Total number of sets (gillnet and line trawl) for each participant in 2J3KL. Participant home ports are given.

Comm	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Black Tickle		48	63	54	64	42	80	72	72	80	80
Williams Hr	54	48	58	50	39	49	60	45		49	
Tub Hr	22	25	28	24	39	80	80	80			
Triangle	24	25	29	29	62	70	80	76	78	80	80
Penny's Hr	46	50	51	62	64	81	81	56	80	80	71
Spear Hr	48	73	81	93	64	80	80	88	80	80	80
St. Lewis		72	83	48	60	80	80	79	80	80	80
Mary's Hr						76	80	80	80	79	80
Cape Charles	28	36	38	32	63						
Quirpon							76				
St. Lunaire	38	52	48	55	64	60	71	76	72	77	70
Great Brehat	56	73	68	76	30						
Goose Cove	60	56	68	72	54	60	60	68	80	80	80
Conche	40	48	48	48	60	60	60	60	61	60	60
Englee	40	46	48	57	55	67	70	70	70	70	70
Hr Deep	36	45	45	49	54	59	65	68	70	70	58
Jackson's Arm	50	59	57	84	53						
Sopp's Arm						50	60	70	70	67	62
Westport						58	69	70			
Coachman's Cove	46	58	51	52	63	70	70	70	70	70	70
Ming's Bight	56	46	46	47	44	57	54	60	49	52	52
La Scie	36	48	50	49	38	70	67	65	58	61	61
Shoe Cove	60	54	51	53	52	60	62	60	54	54	54
Smith's Hr	60	64	62	72	48	58	60	60	60	54	60
Jackson's Cove	56	48	48	48	32	42	38	40			
Miles Cove	56	76	83	83	56	55	68	59	64	70	70
Glover's Hr						54	69	68	69	70	69
Summerford	60	78	84	81	91	72	71	70	82	90	70
Durrell	56	60	39	38	36	57	55	58			
Too Good Arm	39	48	53	54	48	77	70	68	70	70	70
Deep Bay	44	41	45	49	49						
Fogo					64	72	108	113	71	70	70
Joe Batt's Arm	48	32	40	41	80	77	71	87			
Tilting	53	49	45	39	82	78	69	83	65	72	67
Seldom	38	41	31	45	69	72	76	74	59	60	58
Aspen Cove	39	42	45	32	47	59	60	55	47	61	59
Lumsden	74	72	74	63	54	56	54	52	53	53	50
Wesleyville	64	68	91	78	62	68	67	68	68	67	68
Centreville	40	30	32	32	20	36	40	40			
St. Chad's	60	60	62	58							
Happy Adventure					59	56	71	72	70	66	70
Plate Cove West	39	46	52	56	48	68	70	70	70	66	70
Bonavista	1	41	29	20	30	27	33	38			
Little Catalina	60	59	67	74	36	59	44	60	60	57	60
Petley	40	52	56	46	59	80	72	68	63	67	70
Thornlea	60	72	72	66	48	77	84	60			
Hopeall	40	32	32	32	32	40	50	50	50	49	50
Heart's Content	57	16	40	66	48	74	60	60	60	60	59
Bay de Verde		32	49	31	46	68	69	69	69	70	68
Ochre Pitt Cove	40	51	48	48	48	60	60	60			
Carbonear	54	75	73	71	46	60	60	60	56	56	56
Port de Grave	40		48	48	48	60	60	60			
Foxtrap	74	62	64	65	41	46	52	52	48	48	47
Pouch Cove	39	32	43	51	53	56	70	69	70	70	70
Petty Hr					47	57	45	32			
Bay Bulls	121	94	102	108	70	48	46	45	31	60	57
Calvert	60	45	45	52	46	64	60	60	56	60	60
Ferryland	59	44	42	39	40	51	65	68			
Aquaforte	60	47	48	47	32	48	40	40			
Renews	33	37	29	28	32	48	60	60	70	54	62
St. Shott's	34	40	49	51	30	47	40	40	36	32	40
Riverhead	118	114	94	88	69	66	91	84	40	42	40
Admiral's Beach	61	52	68	72	47	57	59	60	60	53	54
Point Lance	58	49	48	48	6	24	36	40	36	40	40
Number of weeks	**15**	**12**	**12**	**8**	**10**	**10**	**10**	**10**	**10**	**10**	**10**
Number of enterprises	**53**	**55**	**56**	**56**	**58**	**58**	**59**	**58**	**44**	**45**	**44**

* two enterprises

Table 2. Ratio of annual mean cpue (#/ 3 1/4" net, experimental sites) for concurrent years by community.

		Gillnet 3 1/4 in. Experimental									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
2Jm + 3Kad	Black Tickle			15.841				1.039	3.534		
	Williams Hr					1.200	1.020				
	Tub Hr		5.467	1.976		2.274		2.655			
	Triangle		5.048			2.308	1.481	1.589			
	Penny's Hr		1.212	2.330		1.308	1.269	1.039		2.736	
	Spear Hr		11.773			1.496		10.691		2.096	
	St. Lewis					3.683		1.709	1.274		
	Mary's Hr							2.179		1.024	
	Cape Charles			0.938							
	Quirpon										
	St. Lunaire		1.385	1.765					3.543		
	Great Brehat										
	Goose Cove								1.172		
	Englee				4.458			1.294	1.993		
	Hr Deep			1.113	1.224			2.507			
	Jackson's Arm										
	Sopp's Arm										
	Westport							0.987			
Northern Inshore area (3Khi+3Lab)	Coachman's Cove					1.097	1.032		6.625		
	La Scie			3.429		2.147	1.577		111.667		0.911
	Miles Cove						0.931	1.518	2.138		
	Glover's Hr							0.991			
	Summerford			2.316	1.035		2.179	1.381	1.375		
	Too Good Arm			0.980		0.943			2.421		
	Deep Bay										
	Fogo										
	Joe Batt's Arm					1.118		1.414			
	Tilting					1.085	1.561	1.127			
	Seldom										
	Wesleyville				1.647	1.088			1.543	1.191	
	Happy Adventure								1.273		1.047
	Plate Cove West			1.298		1.501	1.543		1.780		
	Little Catalina			1.008		1.123	1.099		2.905		
	Petley			1.172		0.944		2.823		0.941	
	Hopeall							1.276	1.216		1.653
	Heart's Content			10.833		1.123		1.233	7.249	1.018	
Southern 3L (3Lfg)	Bay de Verde			0.981				3.836	1.970		
	Foxtrap			0.941	0.977		0.902	1.080	2.245		
	Pouch Cove			1.719	1.151	0.914			1.237		
	Bay Bulls								2.189		
	Ferryland		1.285		3.333	1.369	1.174				
	Renews										
	St. Shott's										
	Admiral's Beach		1.608			1.405			1.623		

no survey in one or both years
ratio is >1.10 (10% or greater increase in mean cpue)
ratio is between .9 and 1.1 (mean cpue is within 10% of the previous year)
ratio is <.9 (mean cpue has decreased by greater than 10%)

Table 2. Ratio of annual mean cpue (#/ 3 1/4" net, experimental sites) for concurrent years by community

		Gillnet 3 1/4 in. Experimental									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
2Jm + 3Kst	Black Tickle			15.841	0.054			1.039	3.534	0.746	1.712
	Williams Hr			0.570	0.625	1.200	1.020	2.983			
	Tub Hr		5.467	1.976	0.156	2.274	0.151	2.655			
	Triangle		5.048	0.434	0.132	2.308	1.481	1.589	0.337	0.883	0.792
	Penny's Hr		1.212	2.330	0.213	1.308	1.269	1.039	0.761	2.736	0.570
	Spear Hr		11.773	0.264	0.820	1.496	0.155	10.691	0.358	2.096	0.496
	St. Lewis			0.593	0.411	3.683	0.435	1.709	1.274	0.637	1.370
	Mary's Hr						0.470	2.179	0.803	1.024	3.865
	Cape Charles			0.938	0.390						
	Quirpon										
	St. Lunaire		1.385	1.765	0.024			0.877	3.543	0.625	2.602
	Great Brehat										
	Goose Cove								1.172	0.891	1.290
	Englee				4.458	0.694	0.348	1.294	1.993	0.541	1.204
	Hr Deep			1.113	1.224	0.838	0.823	2.507	0.849	0.331	
	Jackson's Arm			0.420	0.807						
	Sopp's Arm								0.601	0.648	2.671
	Westport							0.987			
Northern Bonavista Bay - 3Kn + 3Lm	Coachman's Cove			0.585	0.718	1.097	1.032	0.205	6.625	0.898	0.514
	La Scie			3.429	0.708	2.147	1.577	0.031	111.667	0.312	0.911
	Miles Cove		0.622	0.414	0.773	0.842	0.931	1.518	2.138	0.271	2.229
	Glover's Hr							0.991	0.797	0.566	1.905
	Summerford		0.237	2.316	1.035	0.266	2.179	1.381	1.375	0.658	0.740
	Too Good Arm			0.980	0.813	0.943	0.567	0.809	2.421	0.813	1.766
	Deep Bay				0.786						
	Fogo								0.296	1.664	1.812
	Joe Batt's Arm				0.496	1.118	0.522	1.414			
	Tilting				0.614	1.085	1.561	1.127	0.526	1.288	1.628
	Seldom										
	Wesleyville			0.580	1.647	1.088	0.626	0.880	1.543	1.191	1.529
	Happy Adventure						0.868	0.799	1.273	0.422	1.047
	Plate Cove West			1.298	0.299	1.501	1.543	0.854	1.780	0.749	1.158
	Little Catalina			1.008	0.373	1.123	1.099	0.612	2.905	0.742	1.629
	Petley		0.757	1.172	0.777	0.944	0.554	2.823	0.645	0.941	0.606
	Hopeall							1.276	1.216	0.512	1.653
	Heart's Content			10.833	0.442	1.123	0.697	1.233	7.243	1.018	1.188
Southern Bonavista Bay - 3Ls + 3Lt	Bay de Verde			0.981	0.384	0.520	0.437	3.836	1.970	0.707	0.740
	Foxtrap		0.894	0.941	0.977	0.734	0.902	1.080	2.245	0.396	1.889
	Pouch Cove			1.719	1.151	0.914	0.658	0.811	1.237	0.814	1.688
	Bay Bulls			0.524	0.132			0.533	2.188		
	Ferryland		1.285	0.100	3.333	1.369	1.174	0.146			
	Renews										
	St. Shott's										
	Admiral's Beach		1.608	0.760	0.611	1.405	0.773	0.585	1.623	0.608	0.491

No survey in one or both years
Ratio is >1.10 (10% or greater increase in mean cpue)
Ratio is between .9 and 1.1 (mean cpue is within 10% of the previous year)
Ratio is < .9 (mean cpue has decreased by greater than 10%)

Table 3. Ratio of annual mean cpue (#/5 1/2" net, control sites) for concurrent years by community.

		Gillnet 5 1/2 in. Control									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
2Jn + 3Kad	Black Tickle		16.000	5.497		2.400		2.407	8.823		10.978
	Williams Hr		6.540			4.242					
	Tub Hr			6.167				4.800			
	Triangle	4.286	11.900			1.000	0.900	1.170		1.440	
	Penny's Hr		2.000	4.000			2.100		2.800	2.250	2.222
	Spear Hr		41.830		1.276		1.438	7.588			
	St. Lewis					1.083		18.000		4.714	
	Mary's Hr							14.000			
	Cape Charles	1.750	1.000	2.500	1.125						
	Quirpon										
	St. Lunaire										
	Great Brehat										
	Goose Cove										
	Conche										
	Englee										
	Hr Deep										
	Jackson's Arm										
	Sopp's Arm										
	Westport										
Northern Inshore area (3Kn+3Lan)	Coachman's Cove										
	Ming's Bight										
	La Scie										
	Shoe Cove										
	Smith's Hr										
	Jackson's Cove										
	Miles Cove										
	Glover's Hr										
	Summerford										
	Durrell										
	Too Good Arm										
	Deep Bay										
	Fogo										
	Joe Batt's Arm										
	Tilting										
	Seldom										
	Aspen Cove										
	Lumsden										
	Wesleyville										
	Centreville										
	St. Chad's										
	Happy Adventure										
	Plate Cove West										
	Bonavista										
	Little Catalina										
	Petley										
	Thornlea										
	Hopeall										
	Heart's Content										
Southern 3L (3Lfg)	Bay de Verde										
	Ochre Pit Cove										
	Carbonear										
	Port de Grave										
	Foxtrap										
	Pouch Cove										
	Petty Hr										
	Bay Bulls										
	Calvert										
	Ferryland										
	Aquaforte										
	Renews										
	St. Shott's										
	Riverhead										
	Admiral's Beach										
	Point Lance										

no survey in one or both years
ratio is >1.10 (10% or greater increase in mean cpue)
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ratio is < 9 (mean cpue has decreased by greater than 10%)

Table 4. Ratio of annual mean cpue (#/ 5 1/2" net, experimental sites) for concurrent years by community.

		Gillnet 5 1/2 in. Experimental									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
2J+n + 3Kad	Black Tickle		1.445	2.624		4.779			15.000	1.116	
	Williams Hr	1.069	1.067	1.679	2.429			2.667			
	Tub Hr			1.290	1.956		1.270				
	Triangle	2.813	3.843	1.069			2.436	1.088	0.936	1.208	1.077
	Penny's Hr		51.077		0.969			1.394	0.960	1.143	2.667
	Spear Hr	1.556	4.662	1.035	1.166			4.609			1.960
	St. Lewis		3.647	1.919		2.613		1.632	3.900		3.429
	Mary's Hr							2.286	1.700		2.500
	Cape Charles		2.111								
	Quirpon										
	St. Lunaire	18.721			2.2	0.983			3.029		
	Great Brehat	4.504		2.548							
	Goose Cove		0.986	2.126	2.304				2.765		
	Conche	9.309		1.803		0.932			9.278	1.466	2.773
	Englee	14.395		0.975	2.511				4.595	1.247	3.297
	Hr Deep	1.667		1.959					3.667		1.750
	Jackson's Arm	8.743									
	Sopp's Arm							1.039	1.938		1.902
	Westport						1.478				
Northern inshore area (3Kn+3Lab)	Coachman's Cove	11.734		1.044				1.233	2.611	1.800	1.750
	Ming's Bight								1.142	2.379	1.727
	La Scie			6.726				1.765	4.142		2.381
	Shoe Cove			2.491				1.778	1.667	1.747	1.750
	Smith's Hr	1.734	1.893	0.942					4.895	1.111	1.667
	Jackson's Cove	1.846	1.029	1.120			1.097				
	Miles Cove	2.630	0.962				1.025		2.538	1.111	0.918
	Glover's Hr							3.431	1.132	1.200	2.000
	Summerford	2.834	1.103	1.186			0.999		1.917	2.666	
	Burrell	2.145		1.066	1.814		1.000	1.025			
	Too Good Arm	4.957		1.576		1.077		0.992	1.037	1.666	1.400
	Deep Bay	6.078		8.129							
	Fogo								1.167	1.167	2.333
	Joe Batt's Arm	34.150		2.214		1.530		1.346			
	Tilting	9.676		4.038	0.928	0.914		0.962		0.966	
	Seldom	11.368		4.610					2.360	1.735	
	Aspen Cove			2.159				1.366		0.492	1.286
	Lumsden	3.286		1.373					2.240	1.666	1.667
	Wesleyville	1.600	1.504	1.120	1.191				1.767	1.666	
	Centreville	1.275	1.035			1.000					
	St. Chad's	1.364	1.077	1.000							
	Happy Adventure					1.152			1.148		1.000
	Plate Cove West	3.472	1.093	1.264			1.365			1.081	
	Bonavista		1.218	2.102		2.683		1.283			
	Little Catalina	3.364		1.617	1.148			1.649		1.003	2.114
	Petley	2.151	1.284	1.411				1.333	1.019	1.125	
	Thornlea	6.722	1.355			1.353					
	Hopeall	6.000	1.030	1.516		0.981		0.930	2.497	1.181	
	Heart's Content		2.577	0.904		1.098		1.196	1.578	0.929	2.157
Southern 3L (3Lpj)	Bay de Verde		1.037	3.510				1.222	1.750	1.400	1.333
	Ochre Pitt Cove	7.316		3.751							
	Carbonear	3.976		2.049				1.744	2.176	1.400	1.917
	Port de Grave			1.646			1.039	0.979			
	Foxtrap	13.629	1.949	1.849				1.176	2.250	1.273	1.167
	Pouch Cove	14.414	0.965	2.416			0.917		3.947	3.583	
	Petty Hr										
	Bay Bulls	1.497	0.932	1.394			1.849	1.072	2.203	1.571	1.917
	Calvert			2.394	0.976				3.947	1.961	
	Ferryland	3.043	1.789	1.626	1.248			1.444			
	Aquaforte	2.666	2.207								
	Renews				0.921			0.950	1.944	3.871	0.903
	St. Shott's			1.308	0.999				1.107	1.734	
	Riverhead	2.861		1.811	1.028	0.960		0.946	1.750		1.667
	Admiral's Beach	7.861		1.037	0.946	1.025			1.543	1.260	
	Point Lance	1.709		1.725		1.688	16.916		3.748	1.141	

no survey in one or both years
ratio is >1.10 (10% or greater increase in mean cpue)
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Table 3: Rates of annual mean cpue (#/5 1/2" net, control sites) for concurrent years by community

		Gillnet 5 1/2 in. Control									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
Zone 1 - Isles	Black Tickle		16.000	5.467	0.171	7.400	0.200	2.407	5.923	0.786	10.929
	Williams Hr	0.219	6.647	0.400	0.275	4.240	0.302	0.000			
	Tub Hr			6.167	0.215	0.575	0.281	4.500			
	Triangle	4.286	11.000	0.790	0.079	1.000	0.900	1.170	0.524	1.440	2.625
	Penny's Hr	0.714	2.000	4.000	0.750	0.381	2.500	0.294	2.800	2.250	2.222
	Spear Hr	0.750	41.500	0.492	1.278	0.294	1.438	7.648	0.738	0.188	3.923
	St. Lewis				5.688	1.000	0.105	15.000	0.467	4.714	1.152
	Mary's Hr						0.000	14.000	0.842	1.667	9.667
	Cape Charles	1.750	1.000	7.000	1.125						
	Quirpon										
	St. Lunaire	3.774	0.331	1.971	2.400	0.080	0.667	0.377	4.339	0.000	3.922
	Great Brehat	3.216	0.621	1.656	1.133						
	Goose Cove		0.424	0.000	0.222	0.286	1.500	2.714	5.451	0.000	7.753
	Conche	7.500	0.993	1.316	1.234	1.000	0.315	0.478	2.178	2.194	1.916
	Englee	5.612	0.550	3.637	0.516	0.433	0.375	0.462	2.111	1.605	6.735
	Hr Deep	6.250	1.469	3.706	0.320	0.872	0.250	0.286	1.790	1.931	3.158
	Jackson's Arm	4.994	1.500	0.697	0.000						
	Sop's Arm						0.378	1.658	1.000	1.101	1.336
	Westport						1.941	0.000			
Zone 2 - Northern Peninsula (excl. Isles) + Labrador	Coachman's Cove	26.647	0.938	1.180	0.460	0.180	0.675	0.000	4.567	1.556	1.071
	Ming's Bight				0.733	0.200	0.604	1.800	1.111	7.200	0.000
	La Scie		0.260	8.746	0.258	0.942	2.041	0.414	2.000	2.052	4.126
	Shoe Cove		1.254	1.273	1.000	0.121	0.471	1.889	1.988	2.041	1.106
	Smith's Hr	3.407	1.765	1.105	0.302	0.263	0.764	2.447	0.000	1.606	2.253
	Jackson's Cove	1.756	1.354	1.589	0.231	0.000	4.625	0.000			
	Miles Cove	10.583	1.000	0.724	0.250	0.174	1.153	0.385	4.622	0.000	1.000
	Glover's Hr						0.122	2.357	1.676	1.655	0.929
	Summerford	2.300	1.391	1.269	0.269	0.795	0.880	0.000	5.437	2.117	1.103
	Durrell	4.200	1.192	0.793	2.440	0.167	0.000	1.496			
	Too Good Arm	3.992	0.947	1.118	0.000	0.953	1.481	0.000	1.000	2.387	1.177
	Deep Bay	5.537	0.000	2.000	1.147						
	Fogo					0.000	1.565	0.429	0.000	4.950	0.000
	Joe Batt's Arm	8.407	0.194	2.690	0.953	0.675	0.000	0.918			
	Tilting	9.692	0.414	2.529	0.637	0.833	0.125	1.250	0.954	4.383	1.317
	Seldom	4.877	0.831	2.333	0.000	0.491	0.607	1.857	0.000	1.827	0.000
	Aspen Cove		0.130	5.159	0.344	0.000	1.100	0.000	1.552	5.526	0.000
	Lumsden	4.531	0.253	2.542	0.976	0.500	0.507	0.000	1.630	1.511	2.256
	Wesleyville	3.762	0.979	1.247	1.000	0.424	0.038	0.000	1.696	1.306	1.895
	Centreville	1.000	1.411	0.000	0.000	1.124	0.000	0.000			
	St. Chad's	1.635	1.329	1.000							
	Happy Adventure					1.314	0.243	1.466	0.000	1.144	1.559
	Plate Cove West	1.817	2.173	1.234	0.324	0.947	1.115	1.339	0.000	1.482	1.225
	Bonavista		1.855	1.844	0.717	0.766	0.000	0.933			
	Little Catalina	3.017	1.077	1.337	1.117	0.000	0.955	0.000	1.124	0.000	2.663
	Petley	2.353	1.563	1.419	0.851	1.235	1.042	0.000	0.985	0.000	2.013
	Thorniea	4.351	1.154	0.772	0.797	0.939	0.420	0.000			
	Hopeall	13.605	0.538	1.471	0.537	0.966	0.333	0.000	4.000	1.407	0.000
	Heart's Content		1.811	1.787	0.409	1.378	0.286	1.393	2.105	0.976	1.219
Zone 3 - Bonavista Bay + Trinity Bay	Bay de Verde		0.596	4.080	0.376	0.407	0.309	1.469	1.515	1.467	1.647
	Ochre Pit Cove	2.458	1.156	2.450	0.353	0.411	0.655	0.000			
	Carbonear	4.394	0.000	2.149	0.286	1.000	0.000	1.351	1.647	1.211	1.528
	Port de Grave			2.379	0.578	0.000	1.115	0.000			
	Foxtrap	16.267	0.797	2.059	0.500	0.000	1.017	0.000	2.000	1.519	0.000
	Pouch Cove	8.081	0.000	2.032	0.884	0.000	1.024	0.000	6.259	2.708	0.000
	Petty Hr					0.000	0.933	0.000			
	Bay Bulls	2.512	0.000	1.415	0.692	0.000	1.314	1.000	6.286	2.421	0.000
	Calvert		1.495	1.223	0.871	0.000	0.000	2.960	2.176	2.391	0.000
	Ferryland	3.104	1.000	2.652	0.782	0.299	0.000	3.827			
	Aquaforte	5.416	1.834	0.000	0.644	0.227	0.000	1.151			
	Renews			1.043	0.047	0.261	0.000	1.149	5.833	0.000	0.000
	St. Shott's		0.000	1.000	1.167	0.000	0.000	0.000	5.167	0.000	0.000
	Riverhead	1.910	0.000	1.268	0.702	1.417	0.973	0.000	1.104	1.268	1.129
	Admiral's Beach	6.146	0.000	1.256	0.000	1.467	0.259	0.000	1.931	1.847	0.000
	Point Lance	1.207	0.000	1.214			13.194	0.000	13.333	0.000	0.000

[redacted] no survey in one or both years
[redacted] ratio is +1.10 (10%) or greater increase in mean count
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		Gillnet 5 1/2 in. Experimental									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
Zone 1 Inset	Black Tickle		1.445	2.624	0.580	4.779	0.290	0.147	19.000	3.316	2.421
	Williams Hr	1.069	1.067	1.579	2.429	0.840	0.575	2.051			
	Tub Hr			1.250	1.956	0.143	1.270	0.135			
	Triangle	2.813	3.543	1.000	0.576	0.174	2.430	1.055	0.935	1.209	1.873
	Penny's Hr	0.431	51.077	0.333	0.967	0.597	0.481	1.286	0.980	3.143	2.803
	Spear Hr	1.558	4.652	1.035	1.188	0.489	0.397	4.509	0.781	0.737	1.906
	St. Lewis		3.647	1.518	0.330	2.813	0.733	1.632	3.900	0.286	3.476
	Mary's Hr						0.095	2.222	1.700	0.900	5.495
	Cape Charles	0.241	2.133								
	Quirpon										
	St. Lunaire	18.721	0.838	0.712	2.209	0.983	0.679	0.341	5.029	0.813	8.739
	Great Brehat	4.504	0.888	2.548	0.240						
	Goose Cove		0.966	2.126	2.394	0.606	0.266	0.706	2.765	0.998	4.715
	Conche	5.309	0.564	1.803	0.788	0.932	0.382	0.307	6.276	1.496	2.772
	Englee	14.395	0.768	0.976	2.511	0.257	0.618	0.287	4.595	1.247	3.387
	Hr Deep	1.887	0.735	1.950	0.361	0.378	0.608	0.472	3.987	0.945	5.792
	Jackson's Arm	8.743	0.594	0.714	0.248						
	Sopp's Arm						0.404	1.039	1.938	0.784	1.972
	Westport						1.475	0.170			
Northern Peninsula area (Zone 3 Left)	Coachman's Cove	11.734	0.627	1.044	0.262	0.448	0.484	1.233	2.511	1.623	1.854
	Ming's Bight				0.860	0.767	0.876	0.484	1.142	2.379	1.777
	La Scie		0.463	6.726	0.261	0.207	0.346	1.766	4.142	0.561	2.321
	Shoe Cove		0.465	2.491	0.690	0.393	0.393	1.776	1.867	1.747	1.793
	Smith's Hr	1.734	1.593	0.942	0.405	0.271	0.897	0.604	4.305	1.111	1.453
	Jackson's Cove	1.546	1.024	1.120	0.461	0.141	1.597	0.795			
	Miles Cove	2.530	0.962	0.846	0.199	0.848	1.025	0.000	3.139	1.114	0.910
	Glover's Hr						0.241	3.431	1.132	1.298	2.882
	Summerford	2.834	1.103	1.199	0.290	0.000	0.999	0.000	3.617	2.666	0.000
	Durrell	2.145	0.879	1.066	1.814	0.744	1.188	1.025			
	Too Good Arm	4.957	0.451	1.576	0.329	1.077	0.000	0.992	1.037	2.938	1.486
	Deep Bay	6.078	0.964	3.128	0.000						
	Fogo					0.631	0.206	2.846	1.642	2.381	2.248
	Joe Batt's Arm	84.150	0.124	2.214	0.927	1.530	0.179	1.340			
	Tilting	9.676	0.369	4.033	0.928	0.914	0.148	0.962	0.576	6.886	2.744
	Seldom	11.368	0.578	4.610	0.450	0.284	0.606	0.391	2.390	1.735	0.000
	Aspen Cove		0.698	2.159	0.350	0.433	0.725	1.366	0.000	9.492	1.309
	Lumsden	3.285	0.806	1.373	0.532	0.809	0.518	0.818	2.240	1.886	1.830
	Wesleyville	1.500	1.504	1.120	1.181	0.511	0.516	0.858	1.707	1.935	0.000
	Centreville	1.275	1.035	0.789	0.448	1.505	0.484	0.000			
	St. Chad's	3.384	1.077	1.286							
	Happy Adventure					1.152	0.140	3.953	1.145	0.000	1.882
	Plate Cove West	3.472	1.009	1.254	0.533	0.786	1.368	0.739	0.000	1.961	0.000
	Bonavista		1.218	2.102	0.626	2.583	0.335	1.263			
	Little Catalina	3.364	0.737	1.617	1.148	0.646	0.000	1.646	0.000	1.003	2.114
	Petley	2.151	1.284	1.411	0.648	0.798	0.725	1.353	1.019	1.139	0.000
	Thornlea	6.722	1.355	0.453	0.804	1.353	0.762	0.000			
	Hopeall	6.000	1.030	1.516	0.427	0.981	0.000	0.930	2.497	1.183	0.000
	Heart's Content		2.577	0.904	0.470	1.096	0.000	1.195	1.578	0.929	2.137
Southern Bl. (Zone 3 Left)	Bay de Verde		1.037	3.510	0.255	0.628	0.000	1.222	1.729	1.438	1.226
	Ochre Pitt Cove	7.318	0.596	3.751	0.340	0.863	0.447	0.000			
	Carbonear	3.876	0.922	2.049	0.427	0.000	0.000	1.746	2.133	1.302	1.074
	Port de Grave			1.646	0.521	0.147	1.039	0.979			
	Foxtrap	13.626	1.246	1.849	0.664	0.330	0.000	1.170	2.236	1.274	1.129
	Pouch Cove	14.414	0.965	2.416	0.078	0.139	0.917	0.000	5.847	3.283	0.000
	Petty Hr					0.334	0.000	0.000			
	Bay Bulls	4.497	0.932	1.384	0.589	0.129	1.648	1.077	2.703	1.197	1.257
	Calvert		0.500	2.384	0.979	0.066	0.327	0.000	6.240	1.801	0.000
	Ferryland	3.043	1.789	1.628	1.248	0.226	0.416	1.444			
	Aquaforte	2.665	2.207	0.840	0.842	0.277	0.607	0.000			
	Renews			0.881	0.921	0.191	0.312	0.950	1.542	3.671	0.000
	St. Shott's		0.517	1.308	0.999	0.408	0.457	0.000	7.107	1.734	0.000
	Riverhead	2.861	0.866	1.511	1.028	0.966	0.000	0.946	1.750	0.000	1.830
	Admiral's Beach	7.561	0.878	1.037	0.946	1.025	0.304	0.000	1.543	1.280	0.000
	Point Lance	1.708	0.670	1.725	0.000	1.689	15.915	0.000	3.745	1.141	0.000

No survey in one or both years
Ratio is >1.10 (10% or greater increase in mean cpue)
Ratio is between .9 and 1.1 (mean cpue is within 10% of the previous year)
Ratio is < .9 (mean cpue has decreased by greater than 10%)

Table 5. Ratio of annual mean cpue (#/100) hooks, linetrawl control sites) for concurrent years by community

		Linetrawl Control									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
[illegible]	Tub Hr		0.395	3.429							
	Cape Charles		0.177								
	Goose Cove	1.038	5.430	0.257	0.380	1.941					
[illegible]	Coachman's Cove	2.854	1.637	0.464	0.669					2.476	2.337
	Ming's Bight	0.927	1.267	0.409	0.346	0.343	5.042	1.115	0.965	2.364	0.669
	La Scie	1.186	1.54	0.279	0.699			0.606	5.661	0.838	0.824
	Shoe Cove	0.943	1.954	0.511	0.705	0.892	2.088	0.544	2.135	0.916	1.661
	Durrell	0.713	1.89	0.276	0.852			2.400			
	Deep Bay	1.193	2.392								
	Fogo										
	Joe Batt's Arm	0.475	2.668	0.666							
	Tilting	1.194	2.507	0.646							
	Seldom										
	Aspen Cove	0.206	1.524	0.367	1.331	0.326	2.140	1.08	0.713	2.950	0.694
	Lumsden	2.280	1.001	0.737	0.284	0.747	0.841	1.021	2.248	1.010	1.387
	Wesleyville	0.977	1.552	0.734	1.225	1.413	0.638	0.707	1.663	0.98	1.552
	Happy Adventure										
	Bonavista										
	Heart's Content			0.869				1.190			
[illegible]	Carbonear	0.879	2.230	0.273	2.446			2.512	0.286	1.973	1.753
	Foxtrap	2.522	0.336	0.225	2.119	0.811	2.339	0.984	1.778	3.063	1.017
	Bay Bulls										
	Calvert	0.593	2.38	0.794	0.881	2.328	0.954				
	Aquaforte										
	Renews	7.455	3.912								
	St. Shott's	1.776									
	Riverhead	1.964	1.839	0.708	1.710			0.949	1.085	2.346	0.946
	Point Lance									1.126	0.774

Table 6. Ratio of annual mean cpue (#/100) hooks, linetrawl experimental sites) for concurrent years by community

		Linetrawl Experimental									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
[illegible]	Black Tickle										
	Williams Hr										
	Tub Hr										
	Triangle										
	Penny's Hr										
	Cape Charles		0.180								
	Goose Cove	1.042	2.000								
	Sopp's Arm										
[illegible]	Coachman's Cove	0.708									
	Ming's Bight	0.714	1.977	0.429	0.196	1.606	1.306	1.730	1.302	1.156	0.793
	La Scie	1.279	1.895	0.267	0.907			0.719	4.500	0.842	0.978
	Shoe Cove	1.117	2.008	0.393	0.589	0.874	1.225	1.249	1.879	0.927	1.617
	Durrell	1.139	1.287	0.316	0.703	0.546	0.950				
	Deep Bay	2.318	1.647								
	Fogo										
	Joe Batt's Arm	0.538	3.182	0.583							
	Tilting	0.638	1.554	0.886							
	Seldom										
	Aspen Cove	0.692	2.315	0.360	0.893	0.207	2.368	1.161	2.460	0.791	0.998
	Lumsden	1.556	0.883	0.577	0.879	0.766	0.758	1.142	2.201	0.924	1.212
	Wesleyville	1.952	0.703	0.609	1.487	1.321	0.715	0.96	2.128	1.086	0.951
	Happy Adventure										
	Bonavista	1.135	1.09	0.475				0.49			
	Petley										
	Heart's Content			0.435				1.247			
[illegible]	Carbonear	0.847	0.791	0.236	4.915			2.117	0.852	2.704	0.844
	Foxtrap	1.986	1.024	0.264	2.029	0.671	1.389	0.749	2.000	2.779	1.169
	Bay Bulls										
	Calvert	1.150	0.694	0.842	0.949	1.186	0.597				
	Aquaforte										
	Renews	6.548									
	St. Shott's	1.594									
	Riverhead	1.209	1.686	1.206	2.084	0.182	0.948	0.95	2.648	3.007	0.889
	Point Lance									1.067	0.884

Table 5. Ratio of annual mean cpue (#/1000 hooks, linetrawl control sites) for concurrent years by community.

		Linetrawl Control									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
2Jm + 3Kad	Tub Hr			3.429							
	Cape Charles										
	Goose Cove	1.038	5.420			1.041					
Northern Inshore area (3Kn+3Lab)	Coachman's Cove	2.854	1.637	0.464						2.478	2.337
	Ming's Bight	0.927	1.357	0.429			9.042	1.116	0.965	2.364	
	La Scie	1.088	1.547	0.279					6.661		
	Shoe Cove	0.904	1.854	0.511			2.088		2.139	0.916	1.041
	Durrell		1.891					1.493			
	Deep Bay	1.193	2.382								
	Fogo										
	Joe Batt's Arm		2.068								
	Tilting	1.354	2.507								
	Seldom										
	Aspen Cove		3.524		1.331		2.140	1.062		2.969	
	Lumsden	2.280	1.001	0.737				1.021	2.249	1.010	1.397
	Wesleyville	0.977	1.692		1.223	1.413			1.683		1.082
	Happy Adventure										
	Bonavista										
	Heart's Content							1.190			
Southern 3L (3Lfg)	Carbonear		2.230		2.445			2.512		1.973	1.753
	Foxtrap	2.522	1.330		2.119		2.339		1.778	3.963	1.017
	Bay Bulls										
	Calvert		2.393			2.329	0.954				
	Aquaforte										
	Renews	7.466	3.913								
	St. Shott's	1.776									
	Riverhead	1.064	1.639		1.710			0.948	1.040	2.346	
	Point Lance									3.128	

Table 6. Ratio of annual mean cpue (#/1000 hooks, linetrawl experimental sites) for concurrent years by community.

		Linetrawl Experimental									
		96/95	97/96	98/97	99/98	00/99	01/00	02/01	03/02	04/03	05/04
2Jm + 3Kad	Black Tickle										
	Williams Hr										
	Tub Hr										
	Triangle										
	Penny's Hr										
	Cape Charles										
	Goose Cove	1.042	2.000								
	Sopp's Arm										
Northern Inshore area (3Kn+3Lab)	Coachman's Cove										
	Ming's Bight		1.977				1.309	1.730	1.362	1.156	1.793
	La Scie	1.278	1.895		0.907				4.600		0.978
	Shoe Cove	1.117	2.006				1.225	1.249	1.879		1.617
	Durrell	1.138	1.297								
	Deep Bay	2.319	1.647								
	Fogo										
	Joe Batt's Arm		3.162								
	Tilting		1.658								
	Seldom										
	Aspen Cove		2.315				2.366	1.161	2.469		0.988
	Lumsden	1.599						1.142	2.201	0.929	
	Wesleyville	1.952			1.487	1.323			2.128	1.086	0.993
	Happy Adventure										
	Bonavista	1.135	0.925								
	Petley										
	Heart's Content			0.935				1.247			
Southern 3L (3Lfg)	Carbonear	0.907			4.815			2.117		2.704	
	Foxtrap	1.980	1.024		2.029		1.369		2.000	2.779	1.169
	Bay Bulls										
	Calvert	1.160				1.086					
	Aquaforte										
	Renews	8.548									
	St. Shott's	1.894									
	Riverhead	1.299	1.699	1.206	2.084				2.940	3.007	
	Point Lance									1.057	

no survey in one or both years
ratio is >1.10 (10% or greater increase in mean cpue)
ratio is between .9 and 1.1 (mean cpue is within 10% of the previous year)
ratio is < .9 (mean cpue has decreased by greater than 10%)

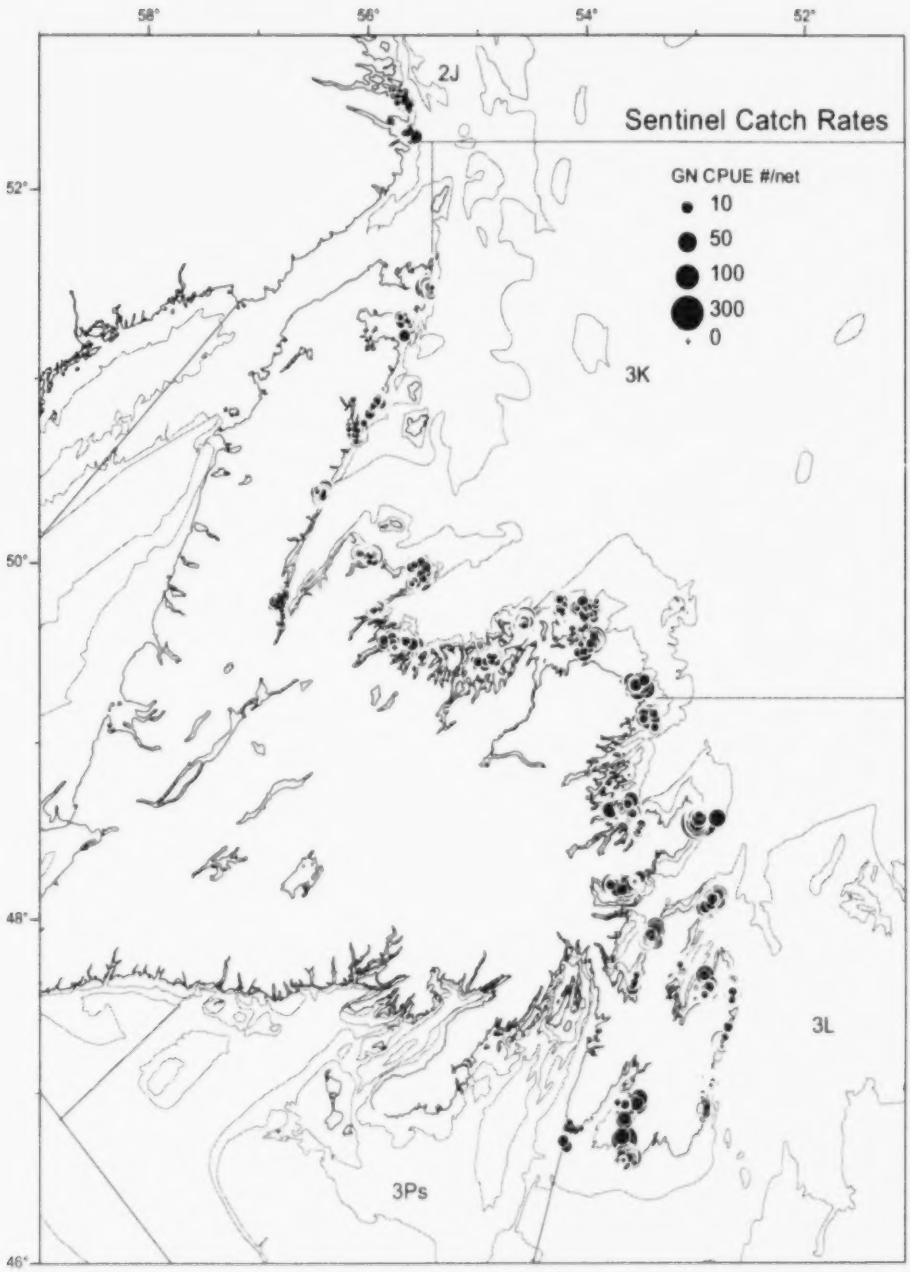


Figure 1. Sentinel survey in 2005 catch per unit effort for 5 1/2" gillnet (#/net).

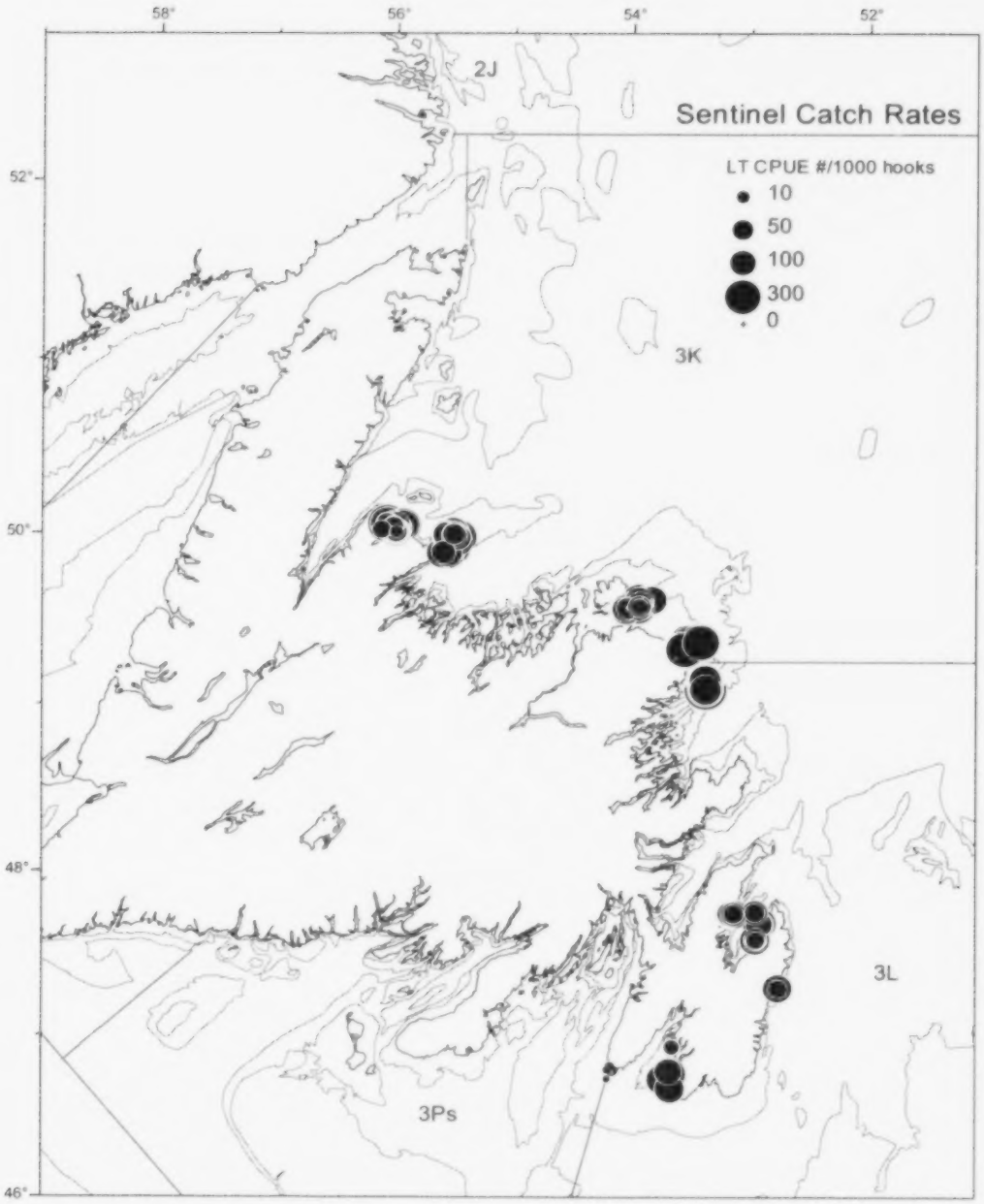


Figure 2. Sentinel survey in 2005 catch per unit effort for linetrawl (#/1000 hooks).

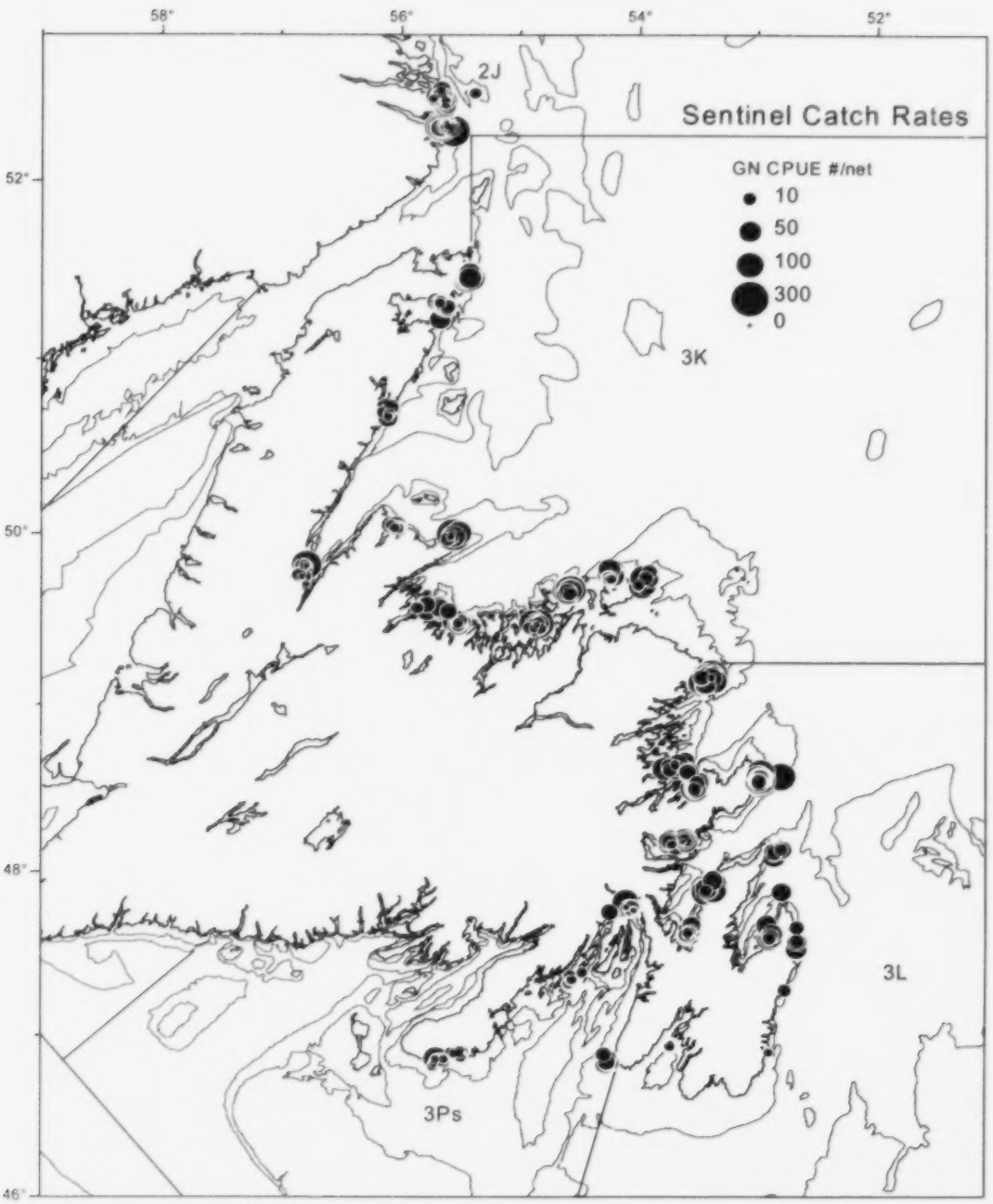


Figure 3. Sentinel survey in 2005 catch per unit effort for small mesh gillnet (3 1/4").

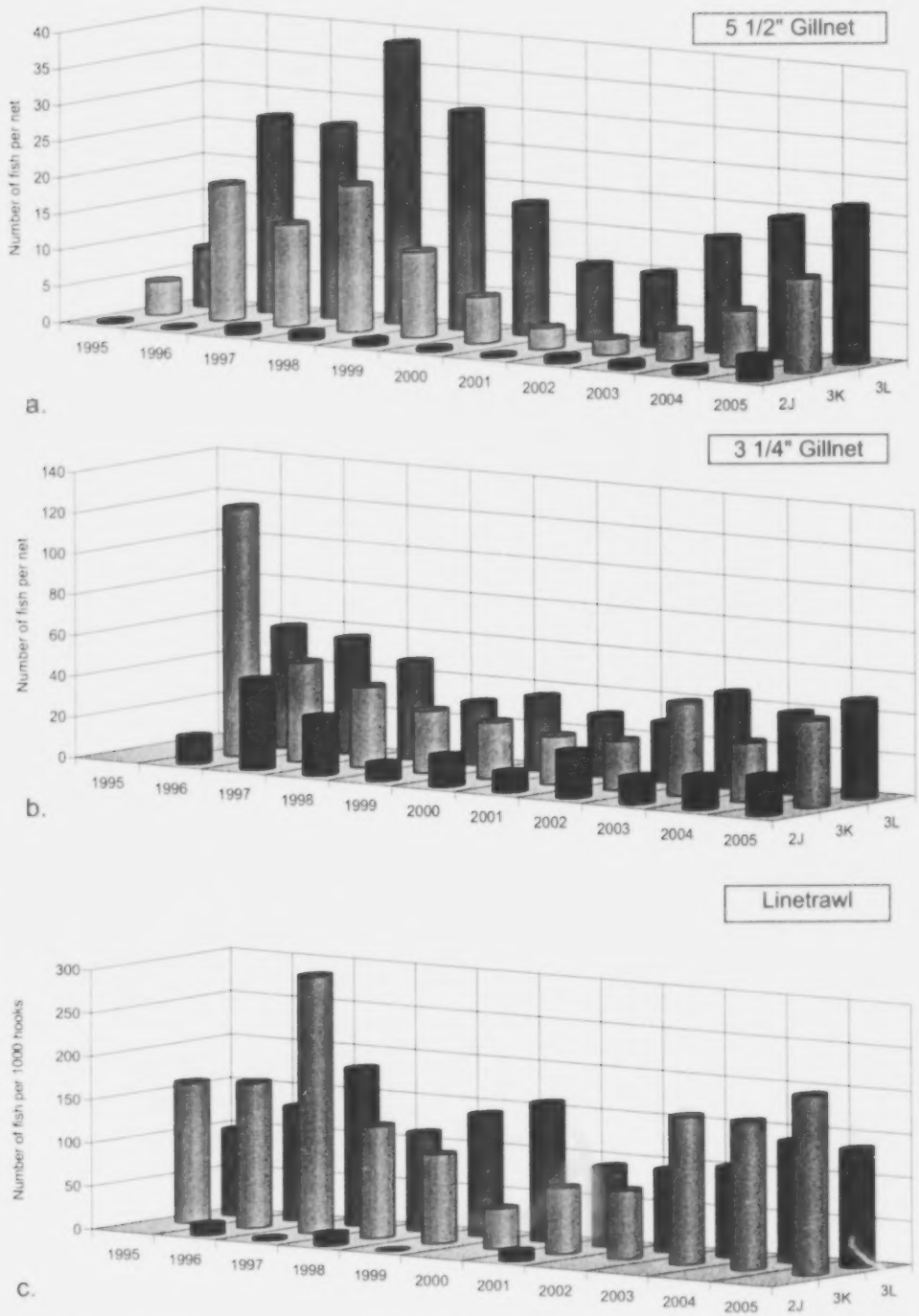


Figure 4. Mean CPUE (# of fish per net or 1000 hooks) by NAFO division for (a.) 5 1/2" gillnet (b.) 3 1/4" gillnet and (c.) linetrawl.

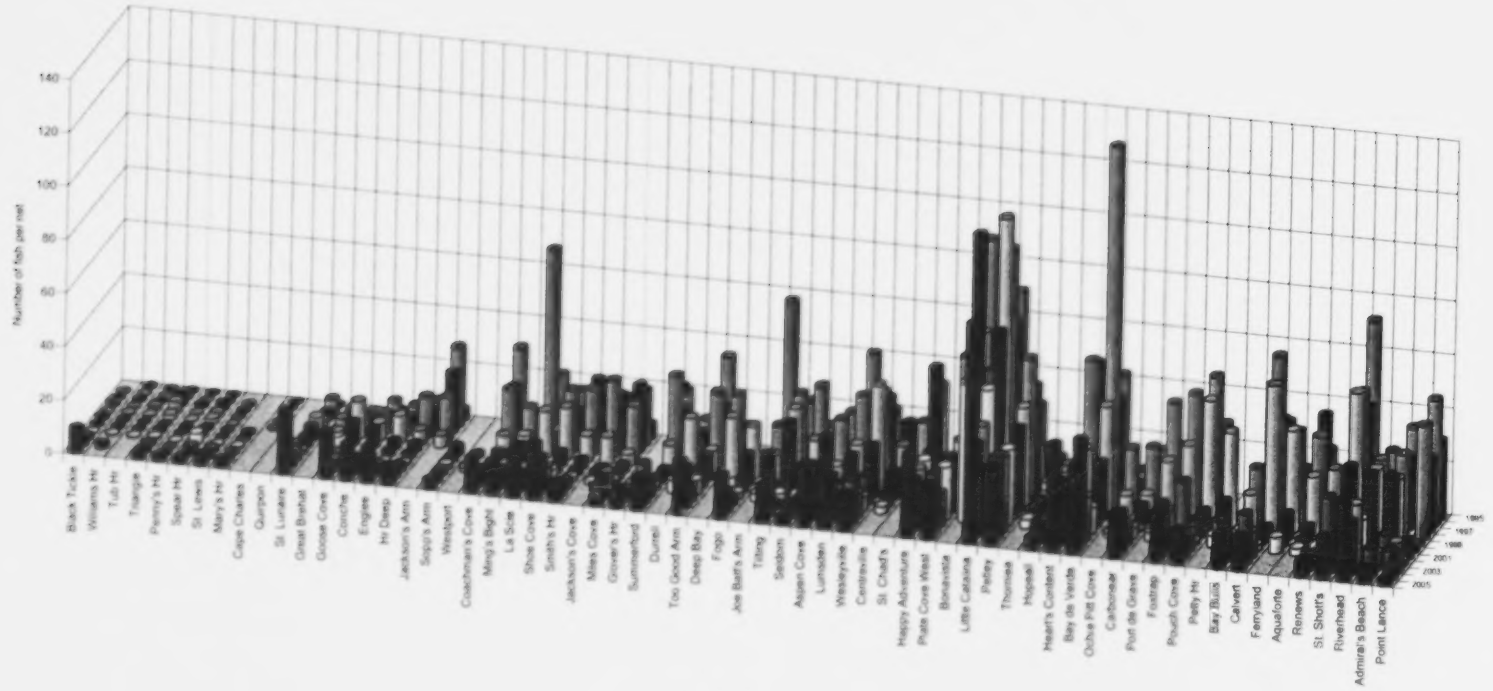


Figure 5. Mean catch per unit effort for gillnet (Number of fish per net) in NAFO divisions 2J3KL by community.

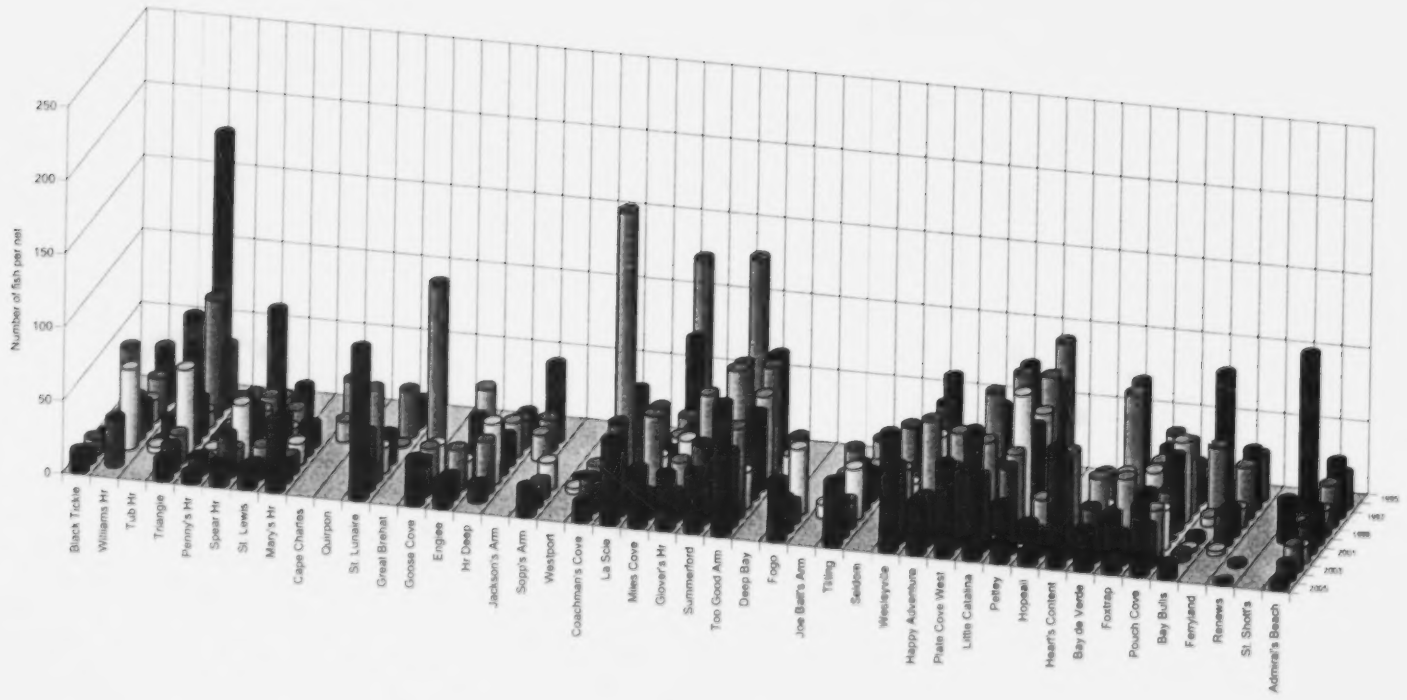


Figure 6. Mean catch per unit effort for small mesh gillnet (Number of fish per net) in NAFO divisions 2J3KL by community.

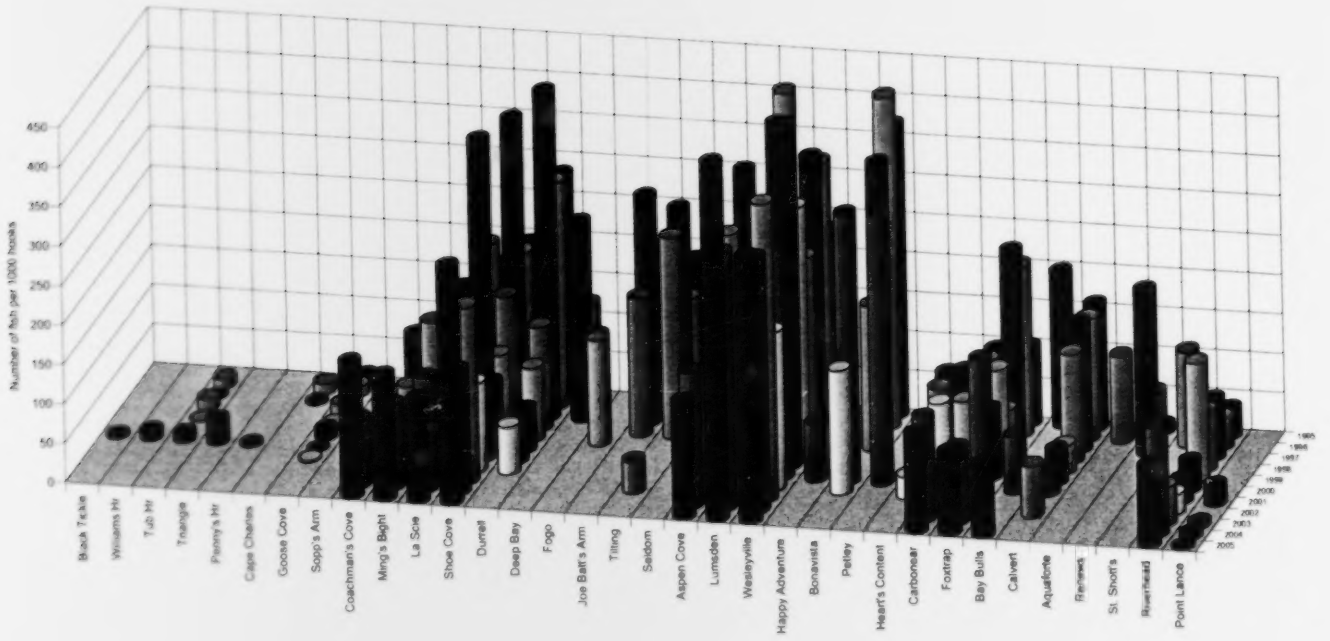


Figure 7. Mean catch per unit effort for linetrawl (Number of fish per 1000 hooks) in NAFO divisions 2J3KL by community.

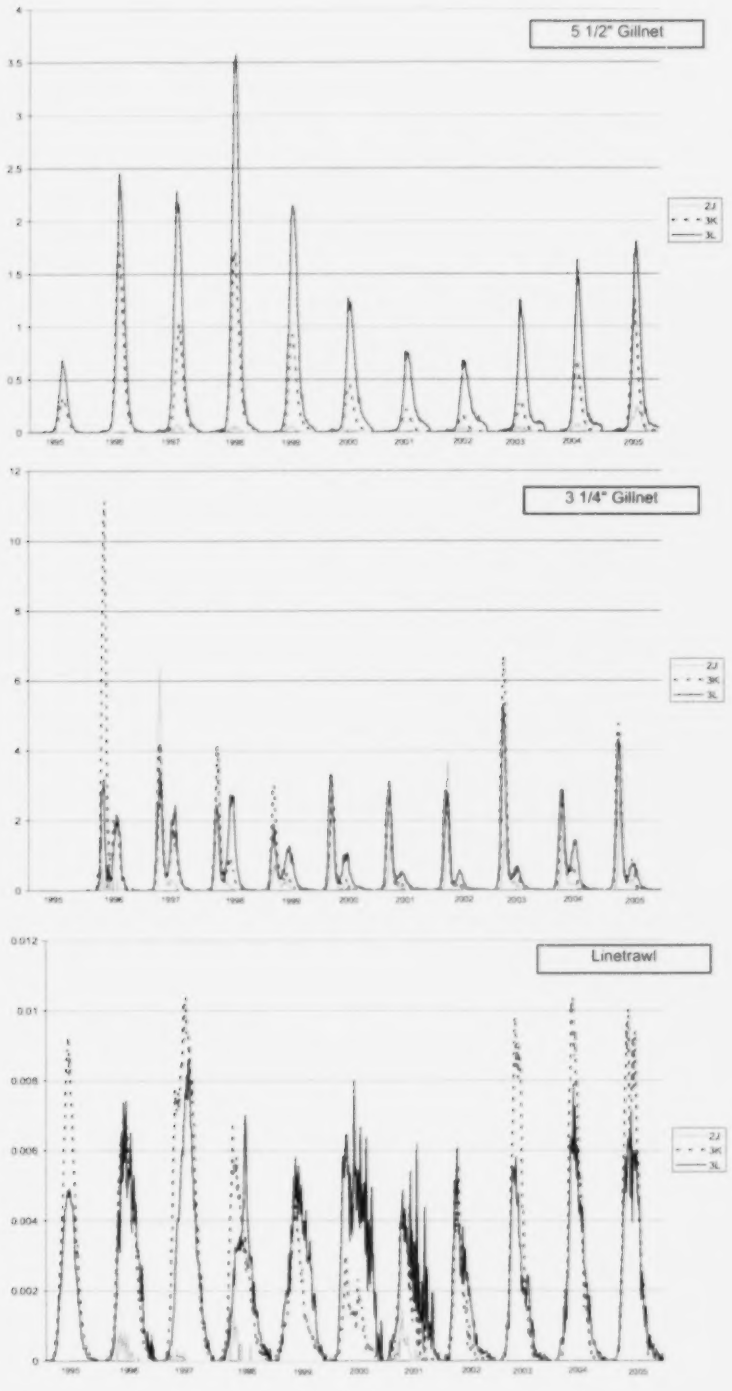


Figure 8. Length frequencies (scaled by amount of gear fished) for gillnet and linetrawl from 1995-2005. Each frequency ranges from 20cm-90cm.

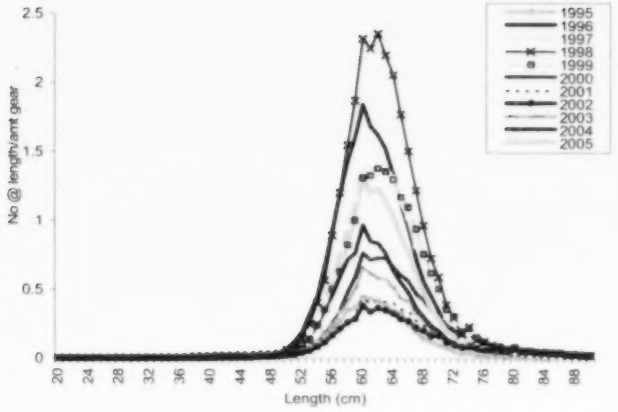
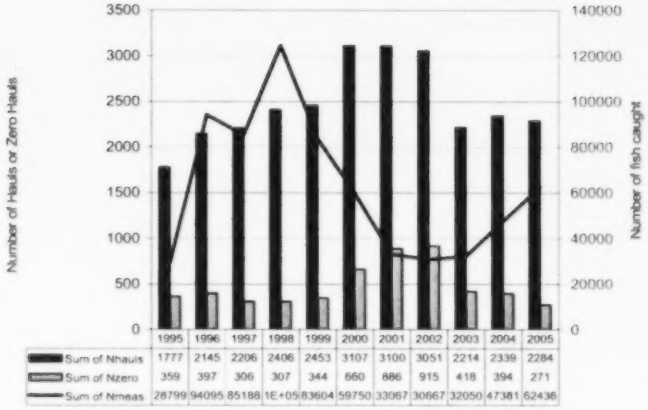


Figure 9. Relative length frequency (number at length / amount of gear) for control and experimental gears, 2J3KL Gillnet 5 1/2 in. Not all years shown.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sum of Nhauls	1777	2145	2206	2406	2453	3107	3100	3051	2214	2339	2284
Sum of Nzero	359	397	306	307	344	660	886	915	418	394	271
Sum of Nmeas	28799	94095	85188	1E+05	83604	59750	33067	30667	32050	47381	62436

Figure 10. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 2J3KL Gillnet 5 1/2 in..

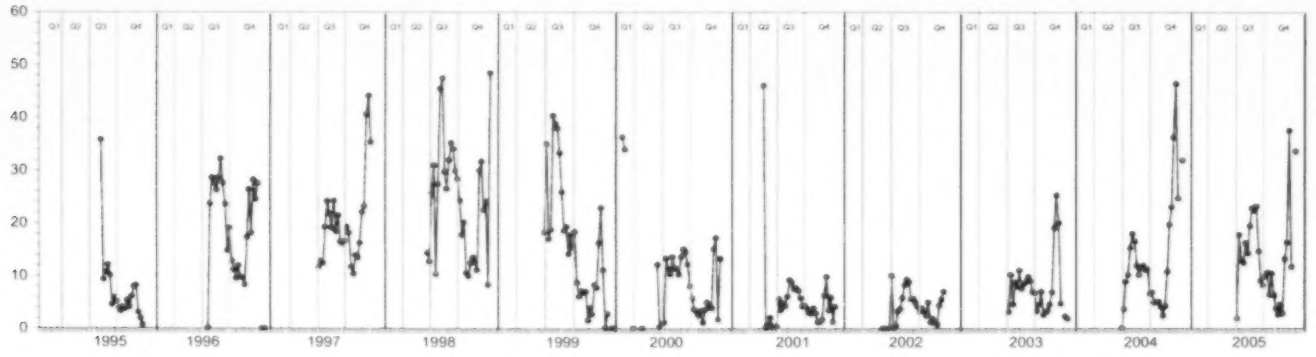


Figure 11. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 2J3KL Gillnet 5 1/2 in..

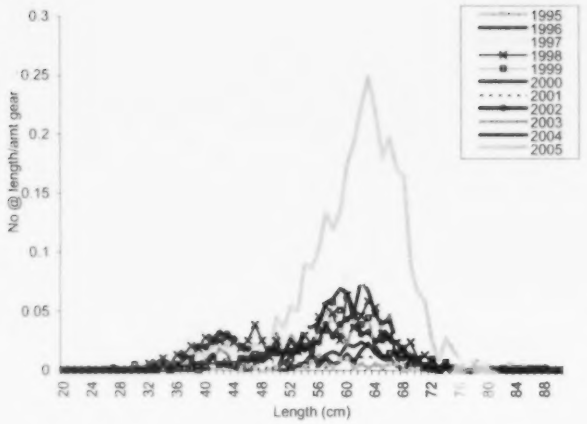
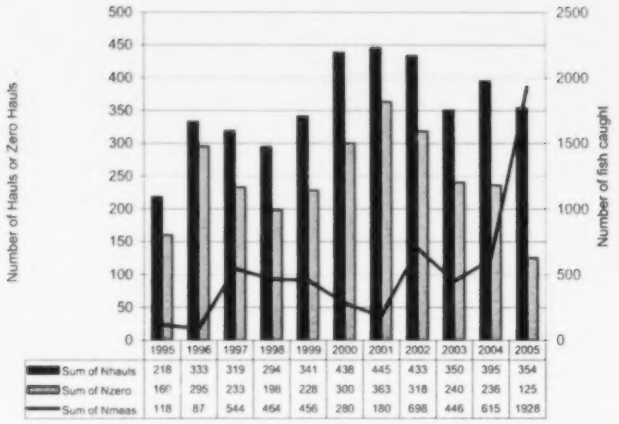


Figure 12. Relative length frequency (number at length / amount of gear) for control and experimental gears, 2J Gillnet 5 1/2 in.. Not all years shown.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sum of Nhauls	218	333	319	294	341	438	445	433	350	395	354
Sum of Nzero	160	296	233	198	228	300	363	318	240	236	125
Sum of Nmeas	118	87	544	464	456	280	180	698	446	615	1928

Figure 13. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 2J Gillnet 5 1/2 in..

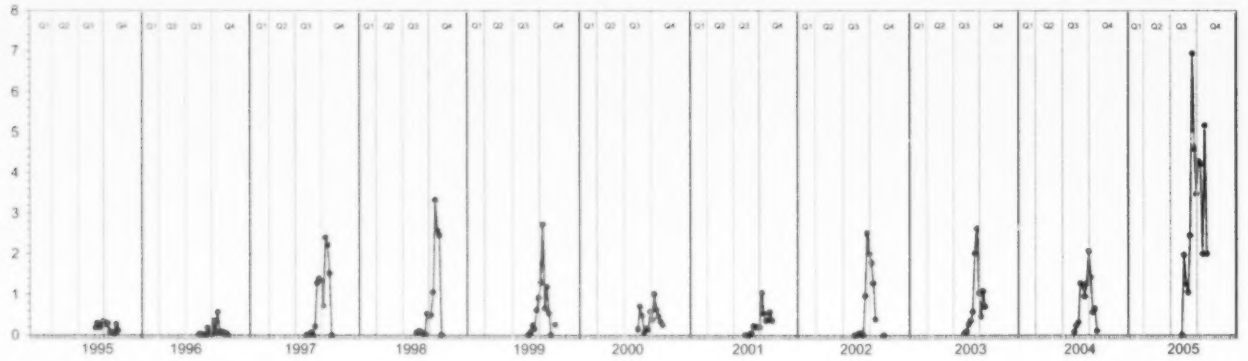


Figure 14. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 2J Gillnet 5 1/2 in..

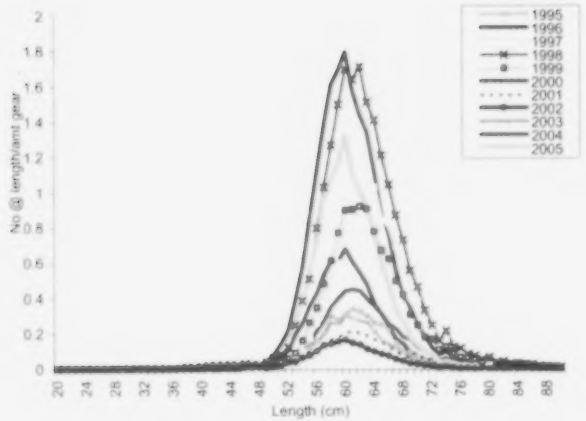
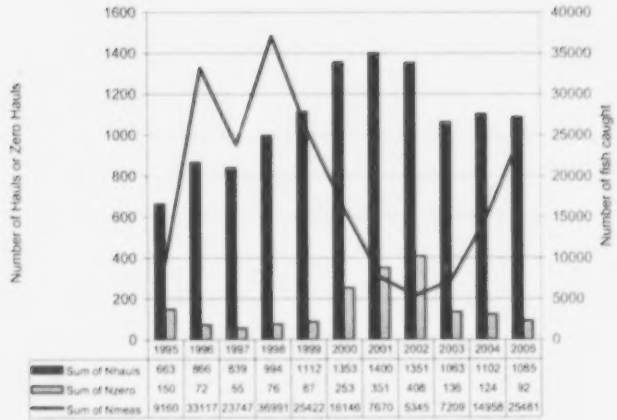


Figure 15. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3K Gillnet 5 1/2 in.. Not all years shown.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sum of Nhauls	663	866	839	994	1112	1353	1400	1351	1063	1102	1085
Sum of Nzero	150	72	55	76	87	253	351	408	136	124	92
Sum of Nmeas	9160	33117	23747	36991	25422	16146	7670	5345	7209	14958	25481

Figure 16. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3K Gillnet 5 1/2 in..

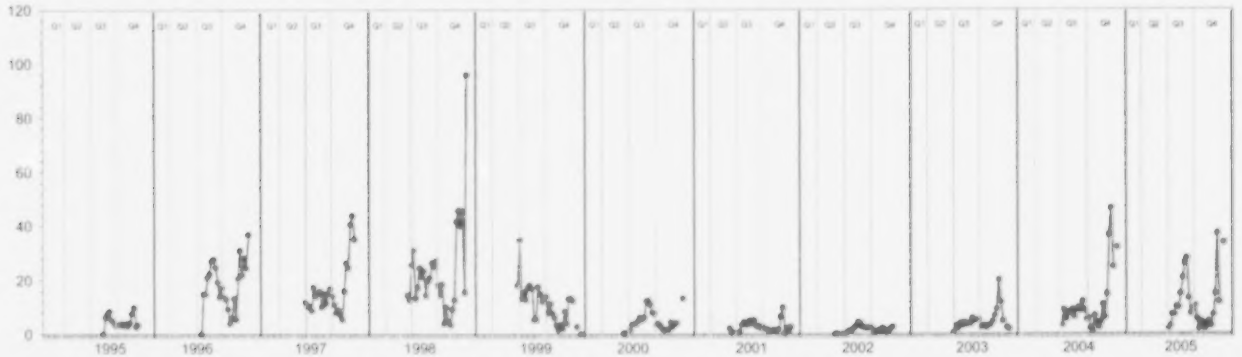


Figure 17. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 3K Gillnet 5 1/2 in..

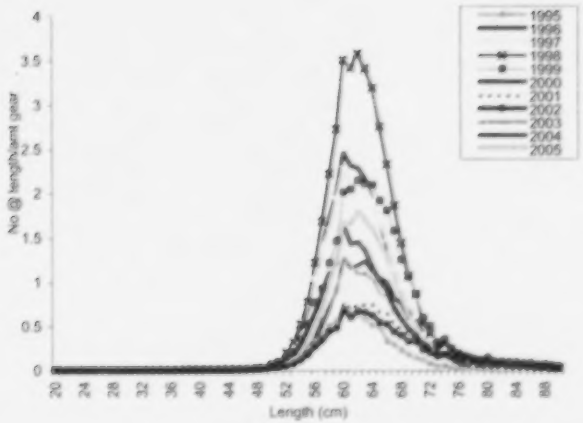


Figure 18. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3L Gillnet 5 1/2 in.. Not all years shown.

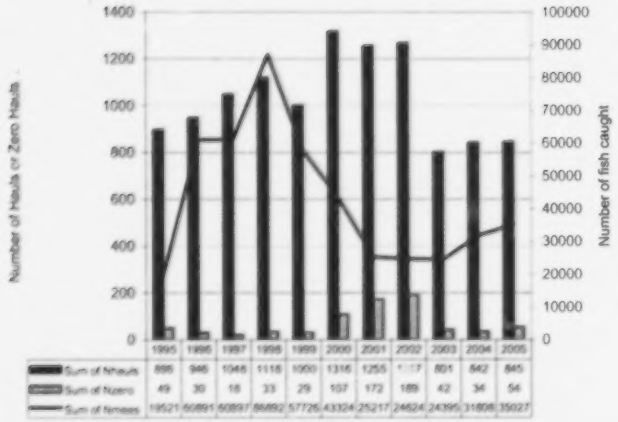


Figure 19. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears. 3L Gillnet 5 1/2 in..

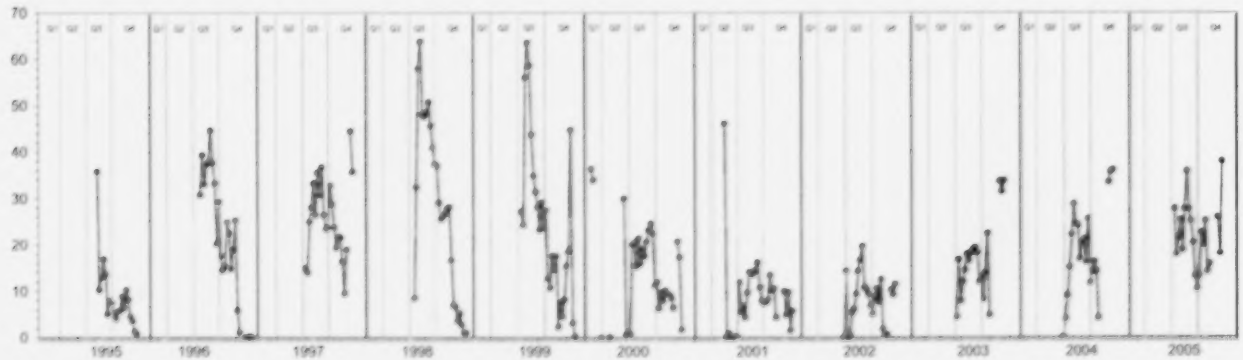


Figure 20. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 3L Gillnet 5 1/2 in..

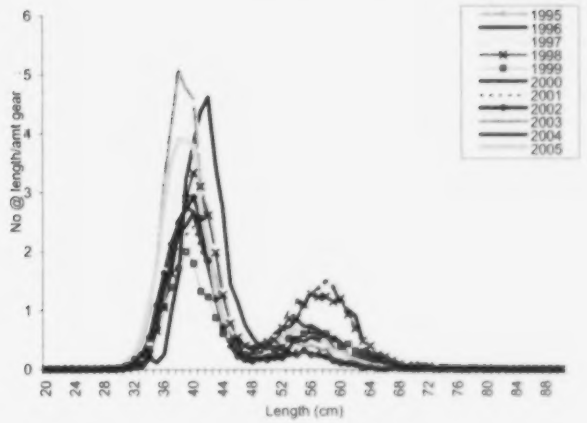


Figure 21. Relative length frequency (number at length / amount of gear) for control and experimental gears, 2J3KL Gillnet 3 1/4 in.. Not all years shown.

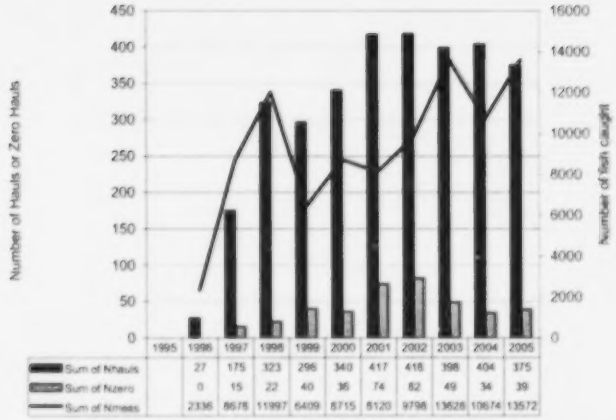


Figure 22. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 2J3KL Gillnet 3 1/4 in..

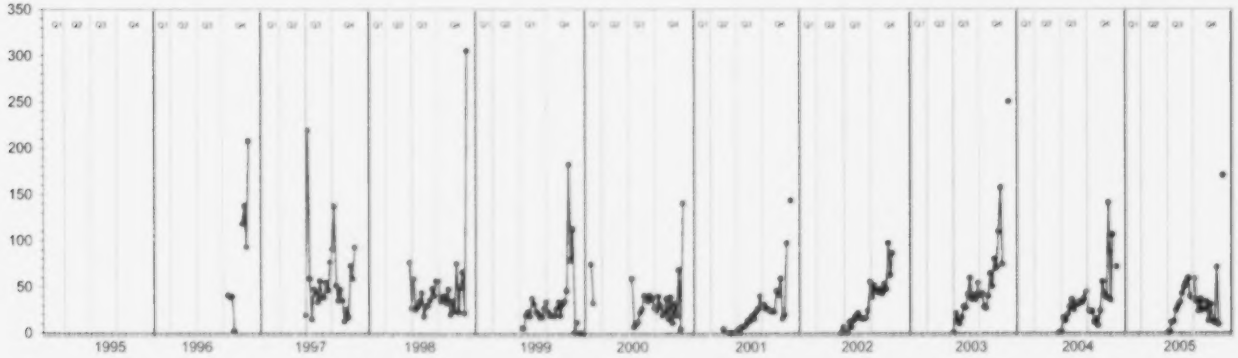


Figure 23. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 2J3KL Gillnet 3 1/4 in..

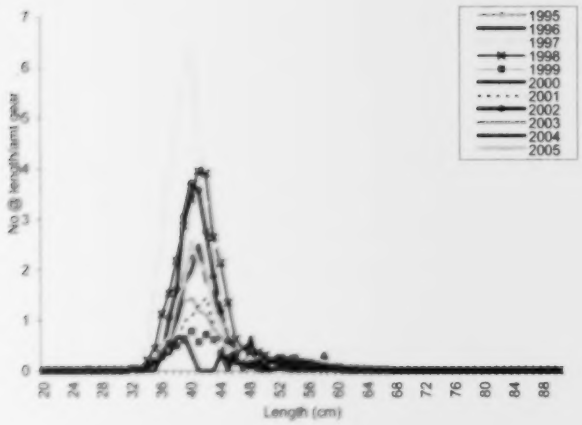


Figure 24. Relative length frequency (number at length / amount of gear) for control and experimental gears, 2J Gillnet 3 1/4 in.. Not all years shown.

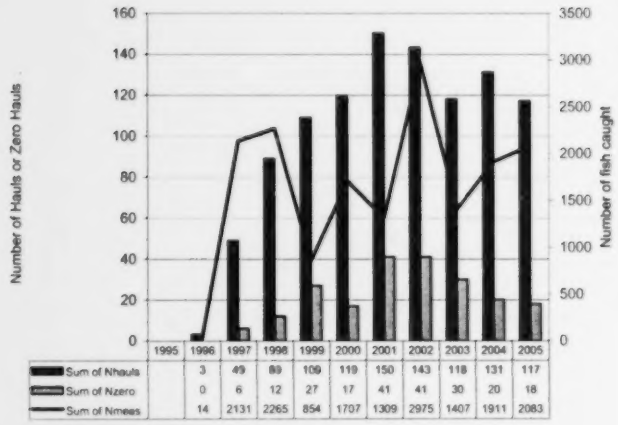


Figure 25. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 2J Gillnet 3 1/4 in..

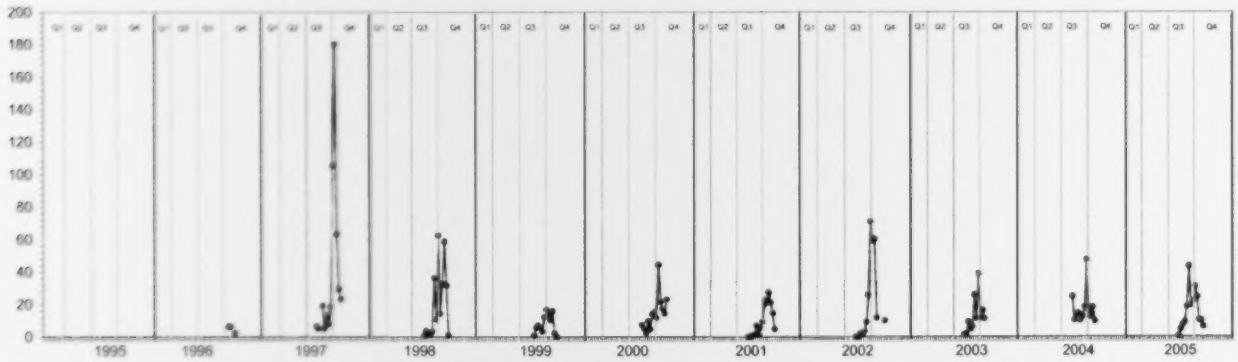


Figure 26. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 2J Gillnet 3 1/4 in..

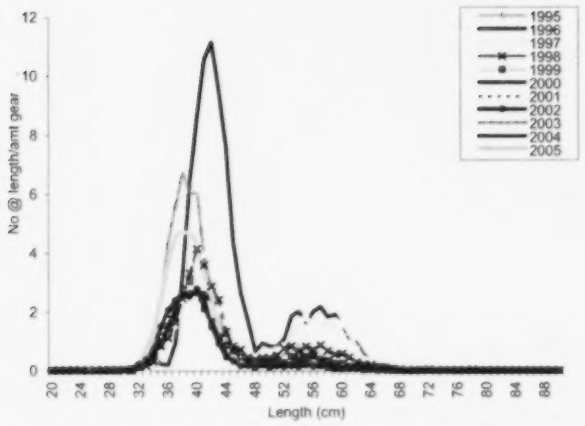


Figure 27. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3K Gillnet 3 1/4 in.. Not all years shown.

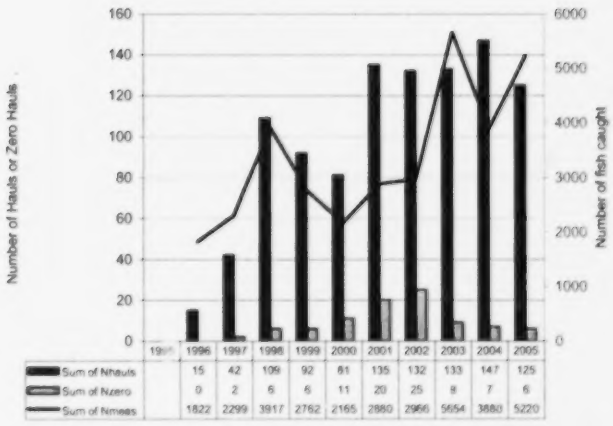


Figure 28. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3K Gillnet 3 1/4 in..

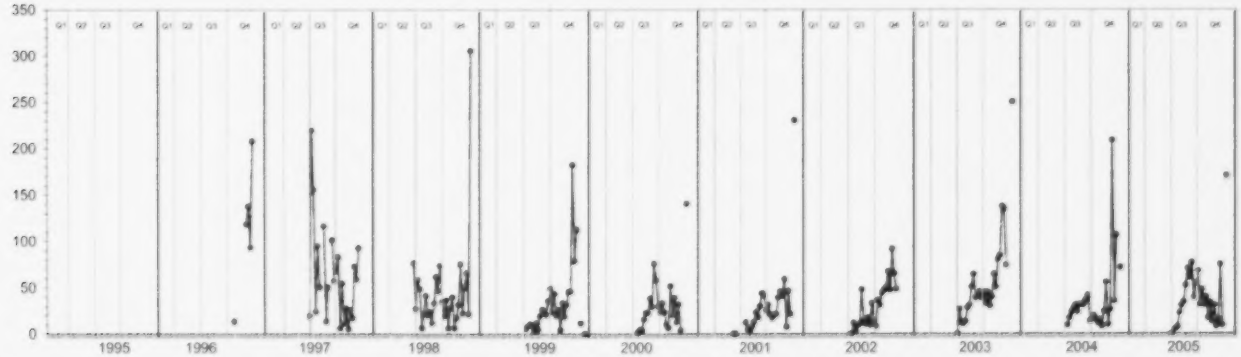


Figure 29. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 3K Gillnet 3 1/4 in..

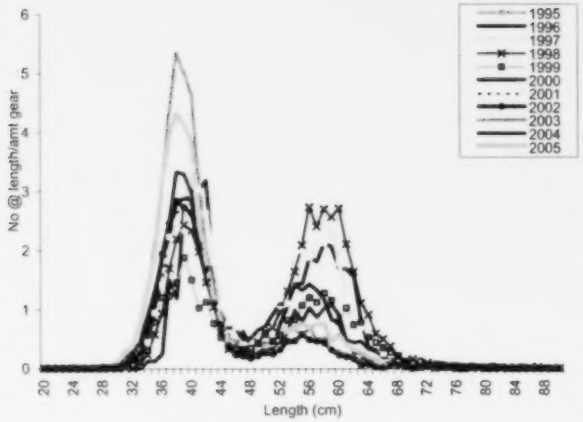
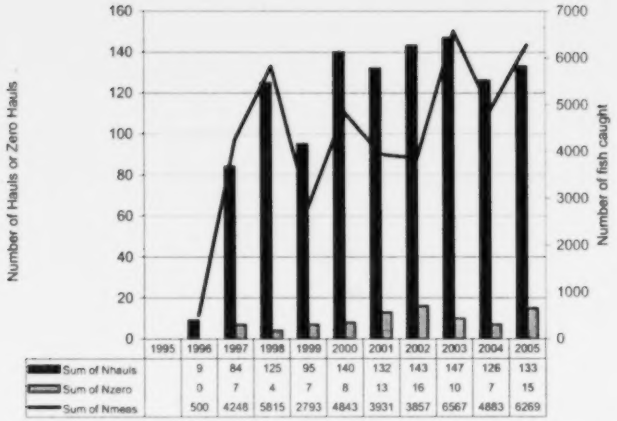


Figure 30. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3L Gillnet 3 1/4 in.. Not all years shown.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sum of Nhauls		9	84	125	95	140	132	143	147	126	133
Sum of Nzero		0	7	4	7	8	13	16	10	7	15
Sum of Nmeas		500	4248	5815	2793	4843	3931	3857	6567	4883	6269

Figure 31. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3L Gillnet 3 1/4 in..

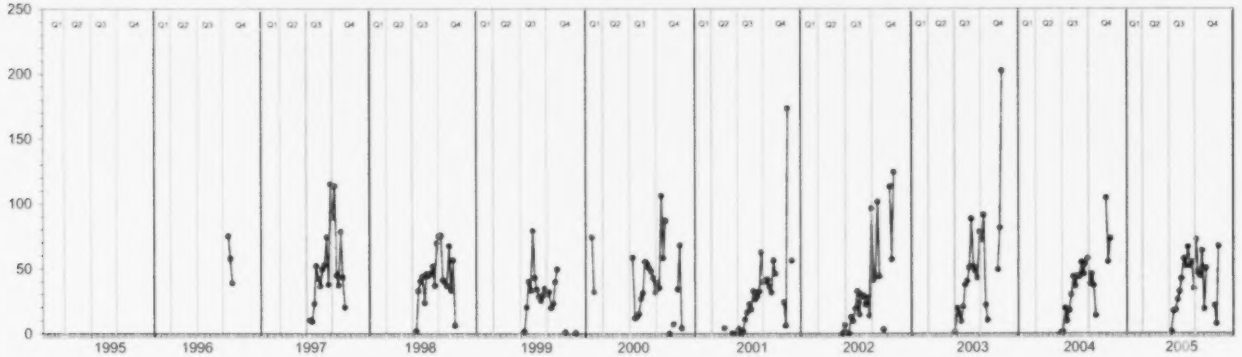


Figure 32. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 3L Gillnet 3 1/4 in..

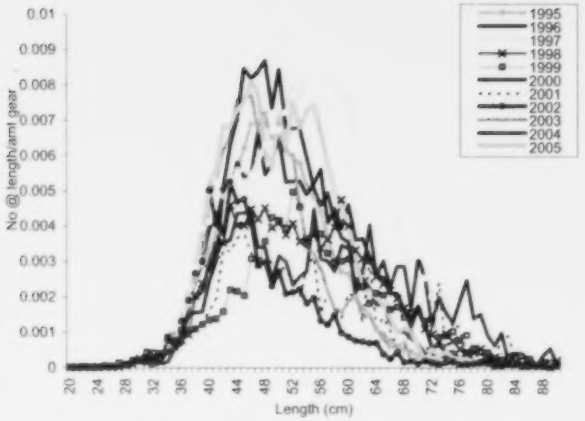
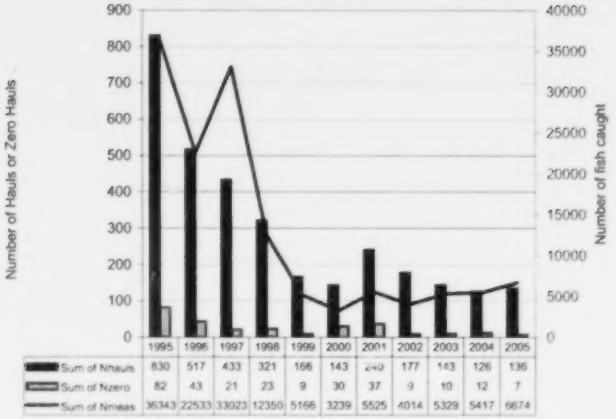


Figure 33. Relative length frequency (number at length / amount of gear) for control and experimental gears, 2J3KL Linetrawl . Not all years shown.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sum of Nhauls	830	517	433	321	166	143	240	177	143	126	136
Sum of Nzero	82	43	21	23	9	30	37	9	10	12	7
Sum of Nmeas	36343	22533	33023	12350	5166	3239	5525	4014	5329	5417	6674

Figure 34. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 2J3KL Linetrawl .

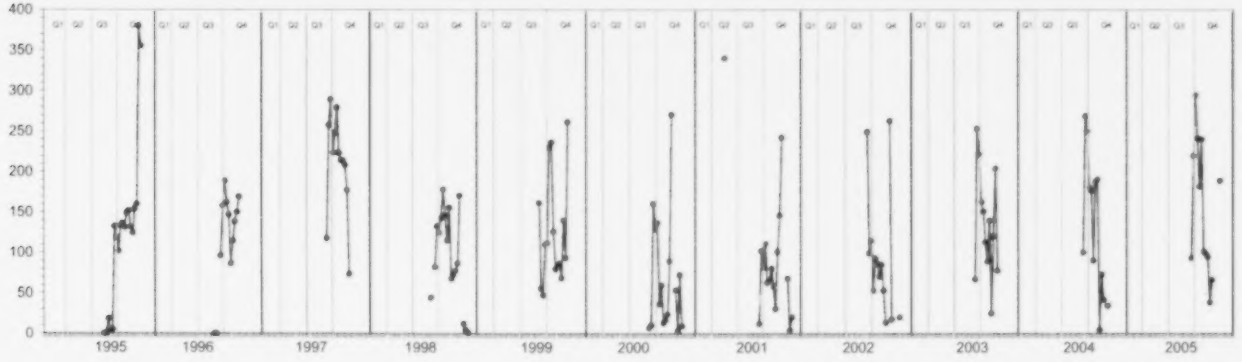


Figure 35. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, 2J3KL Linetrawl .

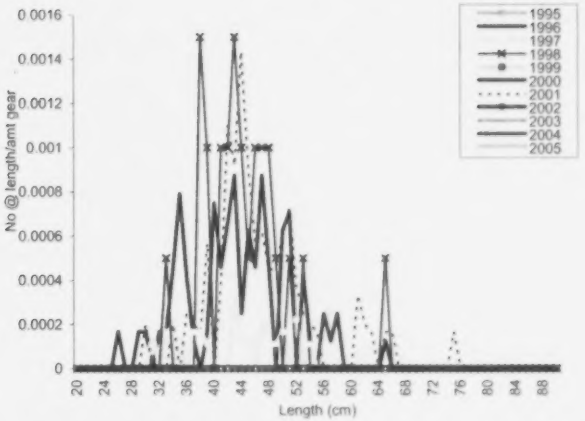


Figure 36. Relative length frequency (number at length / amount of gear) for control and experimental gears, 2J Linetrawl . Not all years shown.

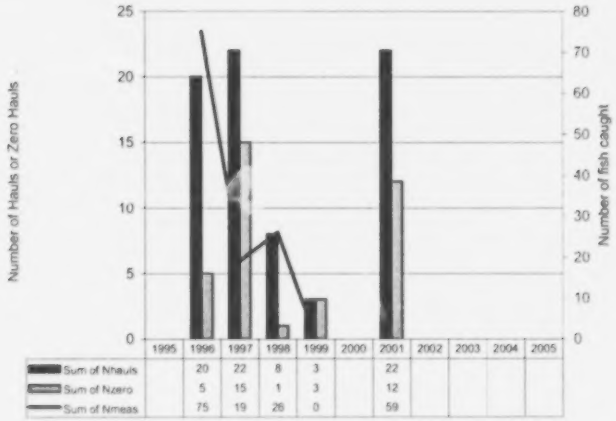

Number of Hauls or Zero Hauls
Number of fish caught
1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005
Sum of Nhauls 20 22 8 3 22
Sum of Nzero 5 15 1 3 12
Sum of Nmeas 75 19 26 0 59

Figure 37. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 2J Linetrawl .

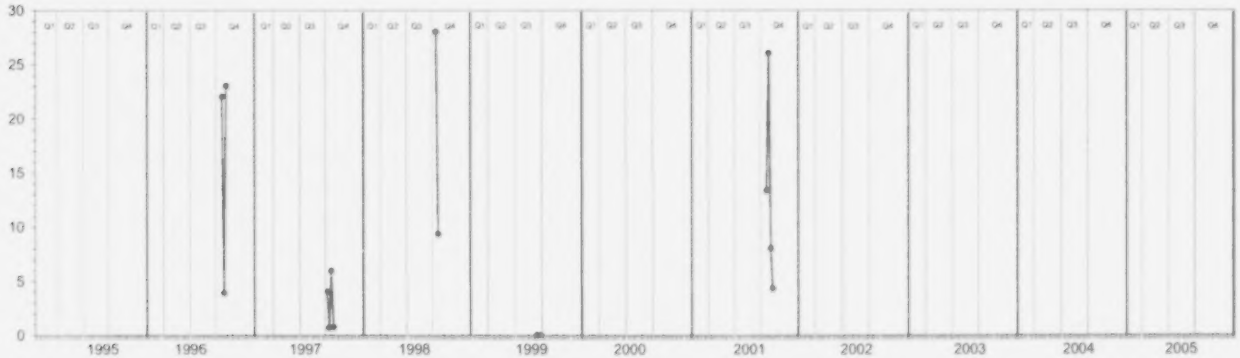


Figure 38. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, 2J Linetrawl .

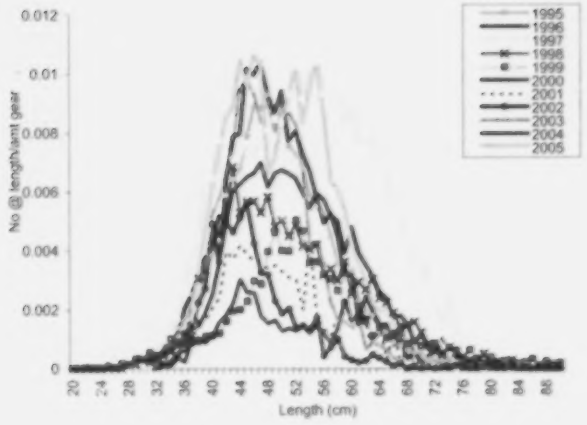


Figure 39. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3K Linetrawl . Not all years shown.

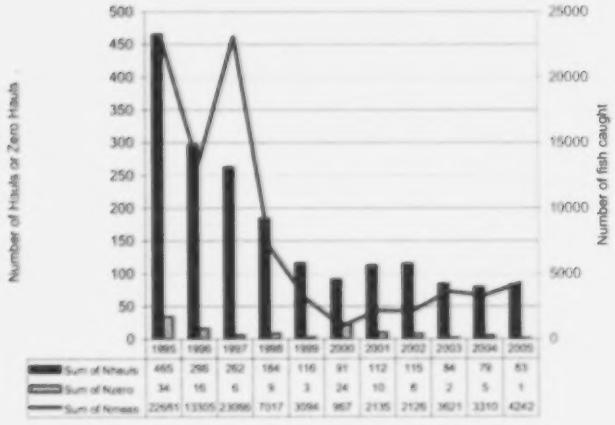


Figure 40. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3K Linetrawl .

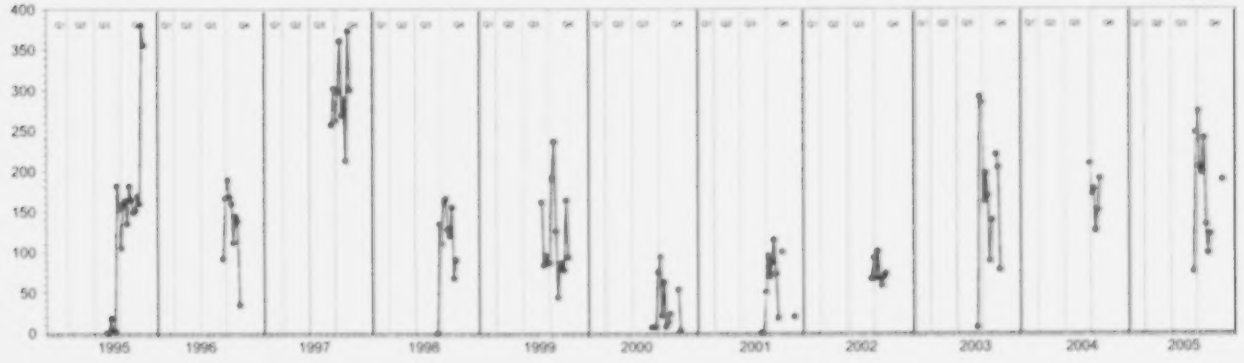


Figure 41. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, 3K Linetrawl .

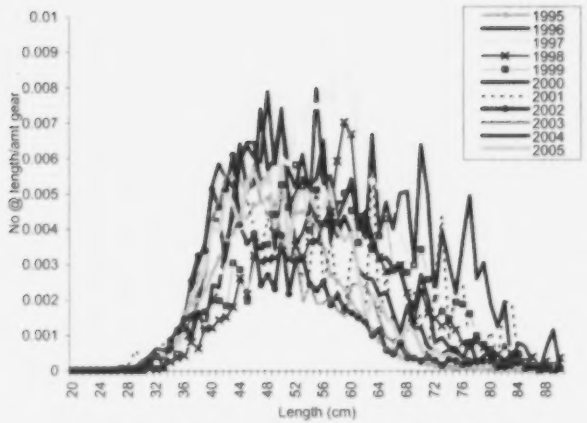


Figure 42. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3L Linetrawl . Not all years shown.

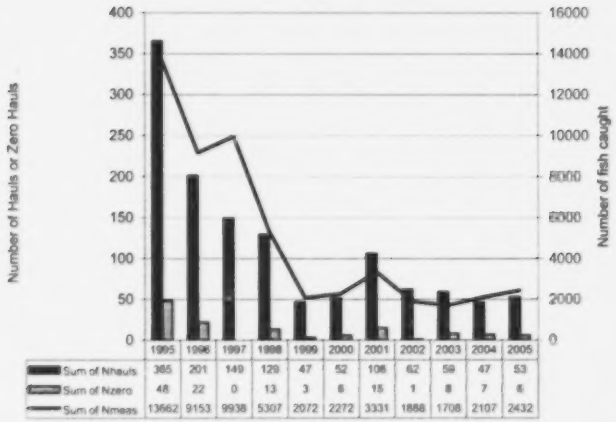


Figure 43. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3L Linetrawl .

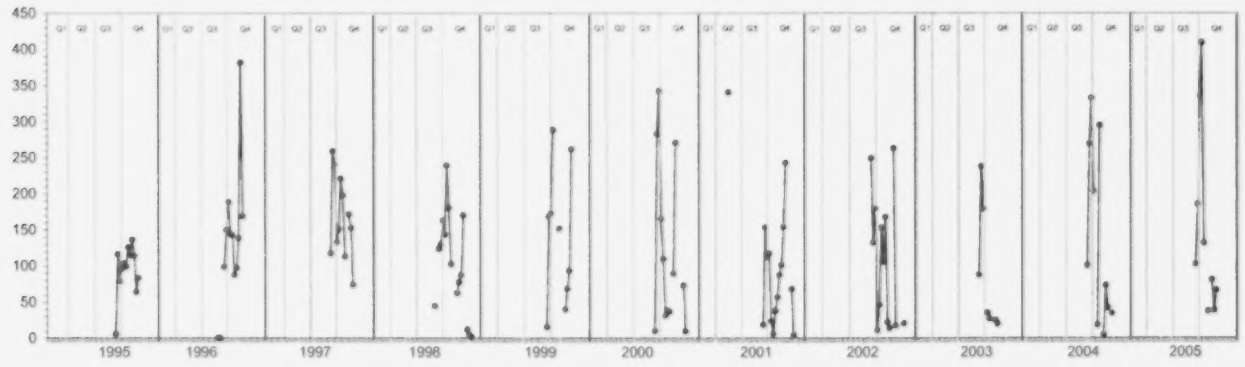


Figure 44. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, 3L Linetrawl .

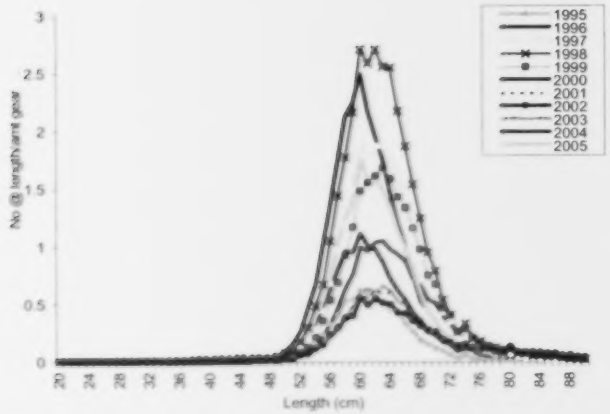
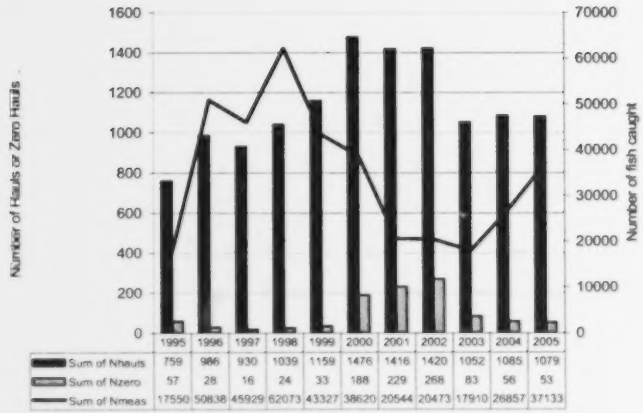


Figure 45. Relative length frequency (number at length / amount of gear) for control and experimental gears, Central inshore (3Khi+3Lab) Not all years shown.



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sum of Nhauls	759	986	930	1039	1159	1476	1416	1420	1052	1085	1079
Sum of Nzero	57	28	16	24	33	188	229	268	83	56	53
Sum of Nmeas	17550	50838	45929	62073	43327	38620	20544	20473	17910	26857	37133

Figure 46. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Central Inshore (3Khi+3Lab) Gillnet 5 1/2 in..

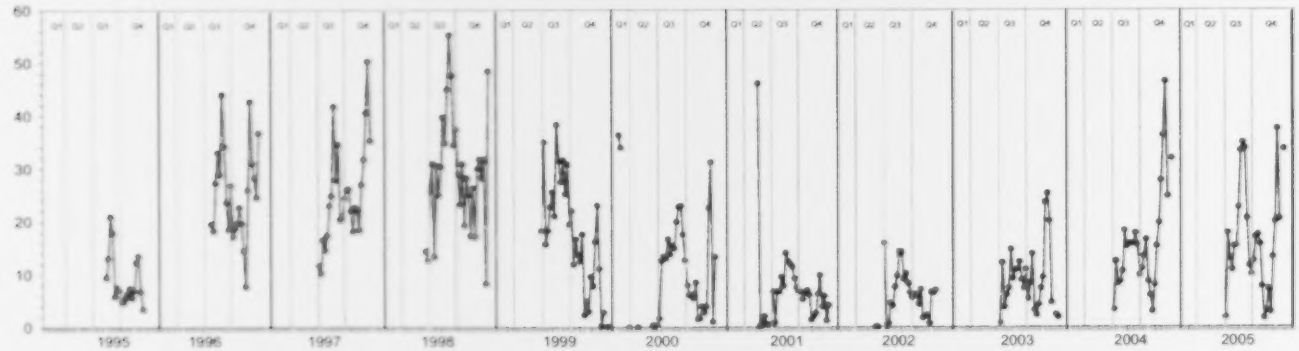


Figure 47. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Central Inshore (3Khi+3Lab) Gillnet 5 1/2 in..

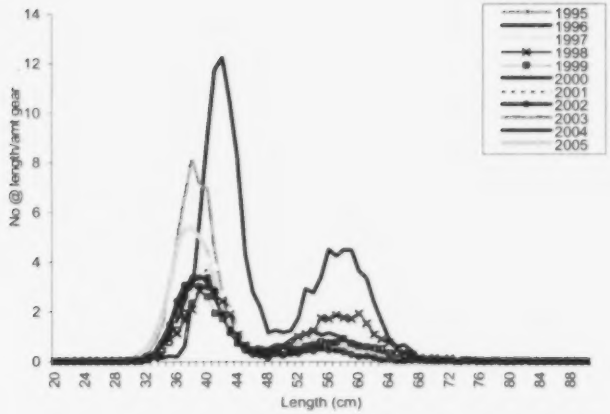


Figure 48. Relative length frequency (number at length / amount of gear) for control and experimental gears, Central Inshore (3Khi+3Lab) Not all years shown.

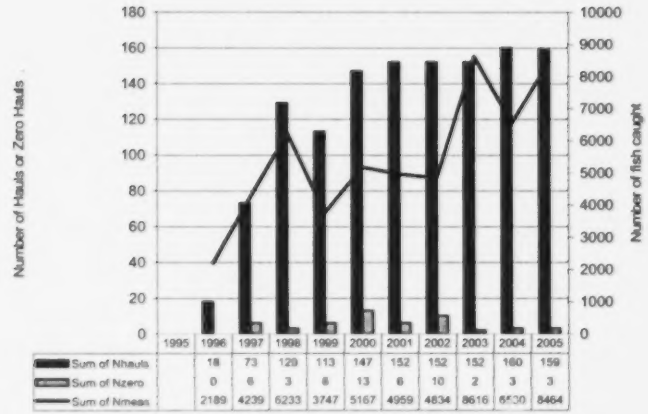


Figure 49. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Central Inshore (3Khi+3Lab) Gillnet 3 1/4 in..

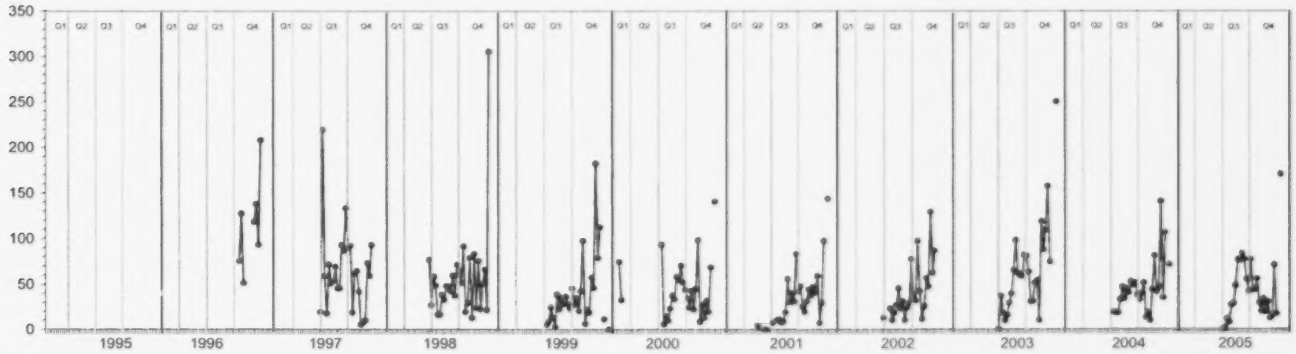


Figure 50. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Central Inshore (3Khi+3Lab) Gillnet 3 1/4 in..

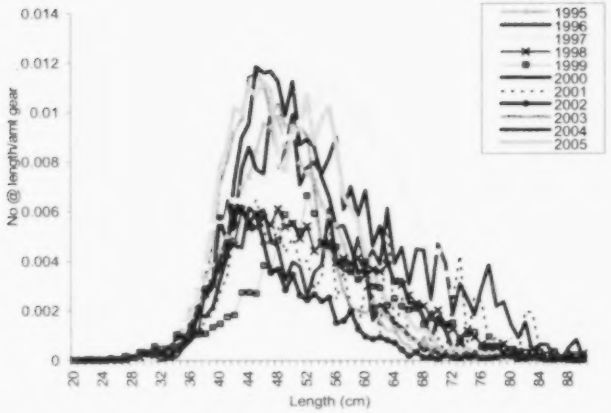


Figure 51. Relative length frequency (number at length / amount of gear) for control and experimental gears, Central Inshore (3Khi+3Lab) Not all years shown.

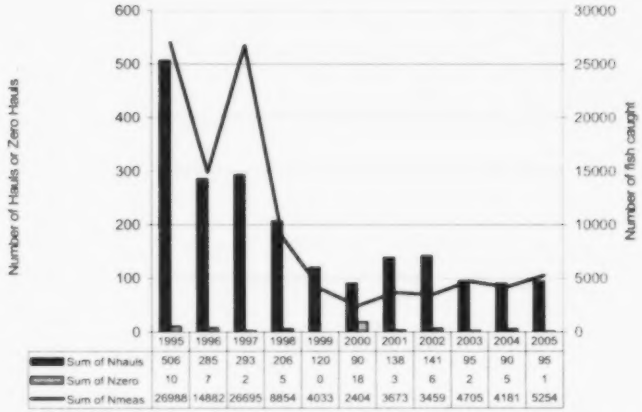


Figure 52. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Central Inshore (3Khi+3Lab) Linetrawl .

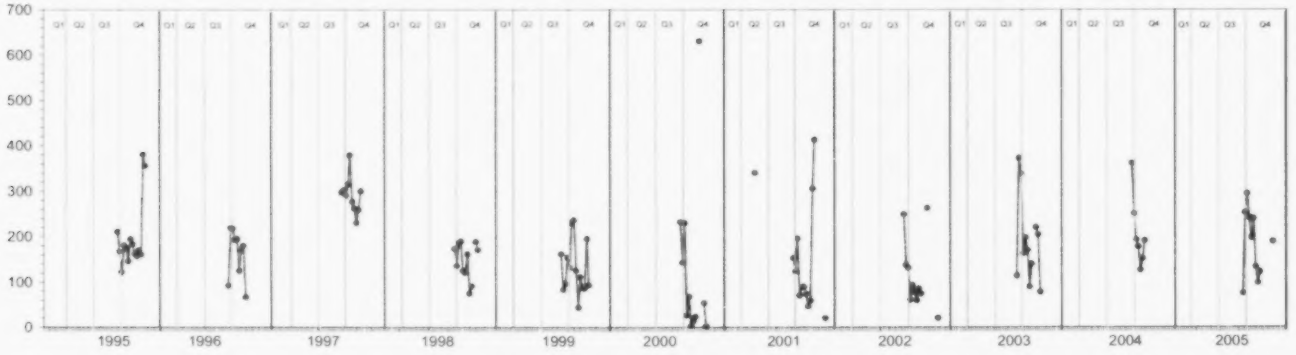


Figure 53. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Central Inshore (3Khi+3Lab) Linetrawl .

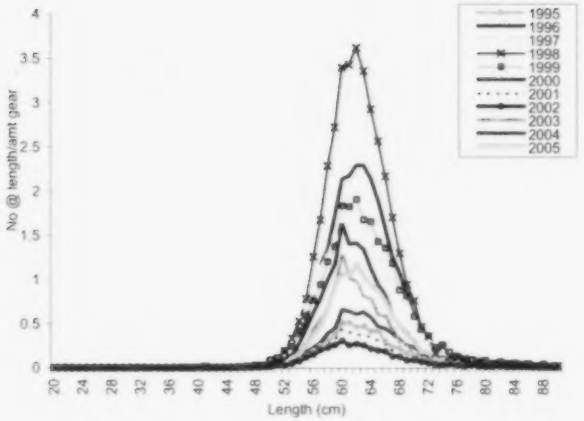


Figure 54. Relative length frequency (number at length / amount of gear) for control and experimental gears, Southern Inshore (3Lfjq) Gillnet 5 1/2 in. Not all years shown.

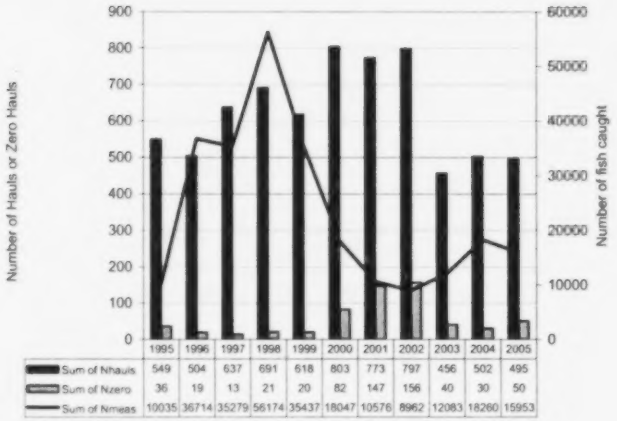


Figure 55. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Southern Inshore (3Lfjq) Gillnet 5 1/2 in..

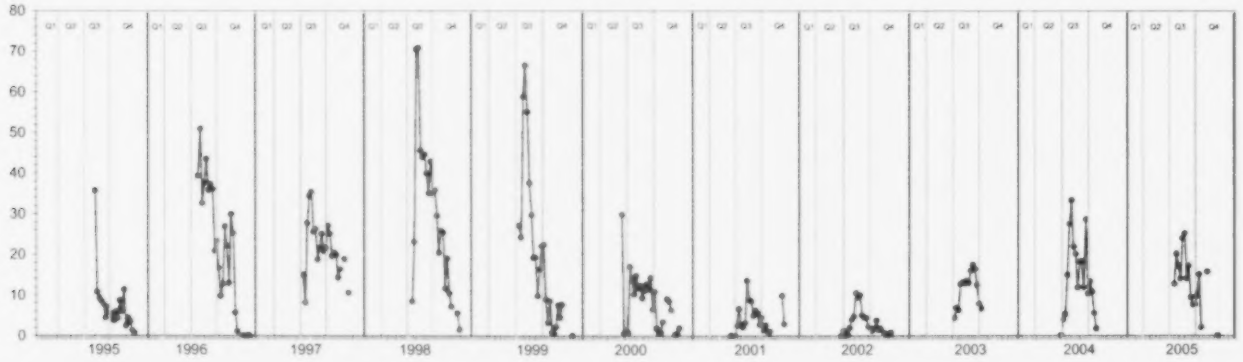


Figure 56. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Southern Inshore (3Lfjq) Gillnet 5 1/2 in..

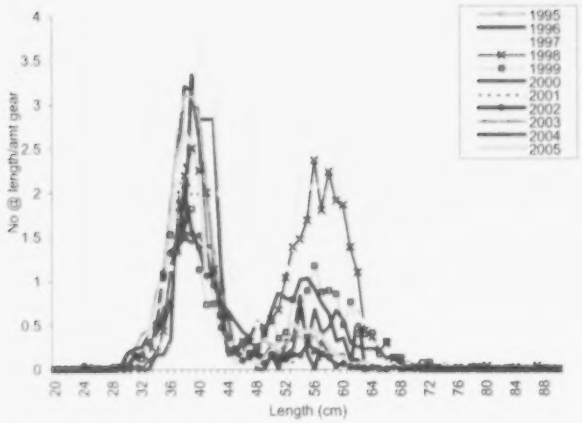


Figure 57. Relative length frequency (number at length / amount of gear) for control and experimental gears, Southern Inshore (3Ljfjq) Gilln Not all years shown.

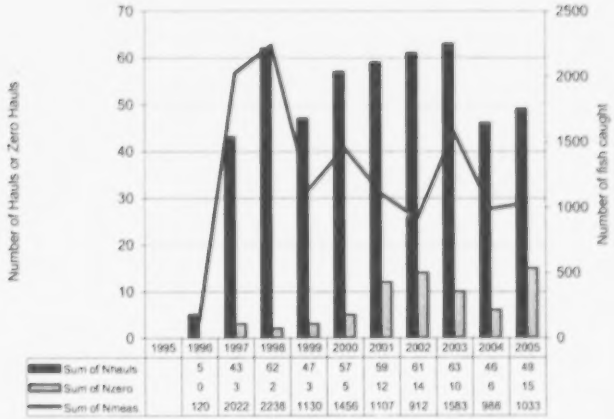


Figure 58. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Southern Inshore (3Ljfjq) Gillnet 3 1/4 in..

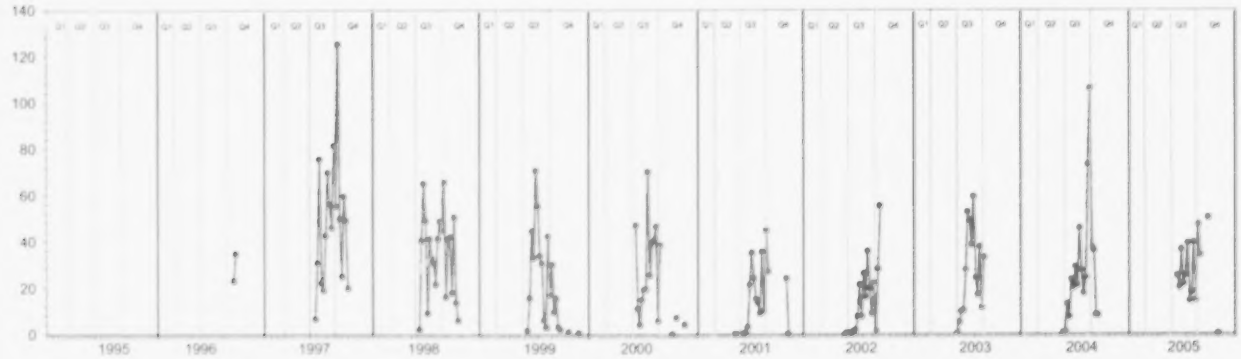


Figure 59. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Southern Inshore (3Ljfjq) Gillnet 3 1/4 in..

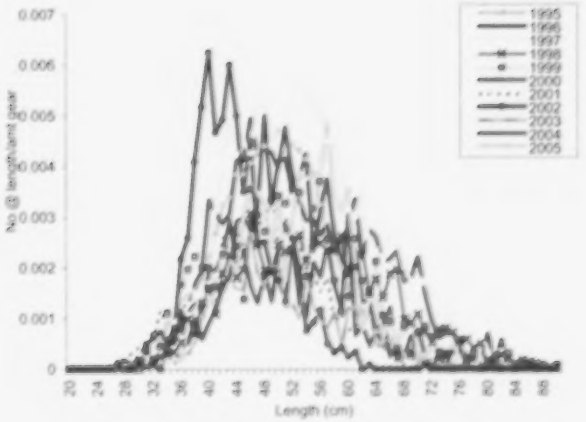


Figure 60. Relative length frequency (number at length / amount of gear) for control and experimental gears, Southern Inshore (3Lfjq) Line Not all years shown.

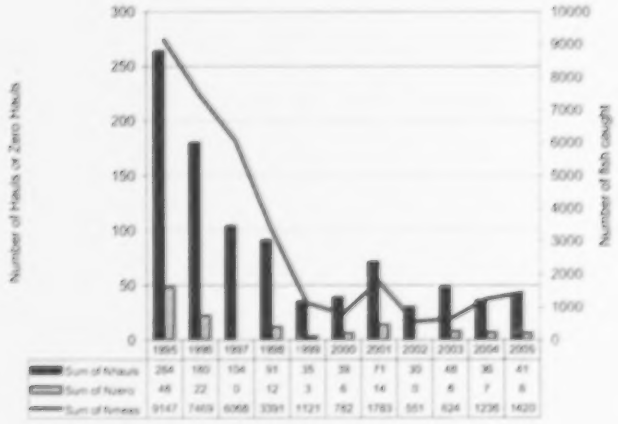


Figure 61. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Southern Inshore (3Lfjq) Linetrawl .

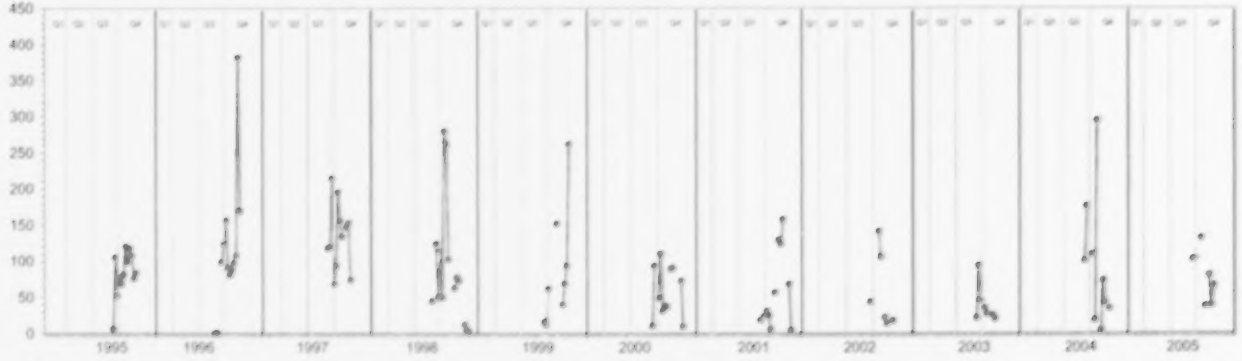


Figure 62. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Southern Inshore (3Lfjq) Linetrawl .